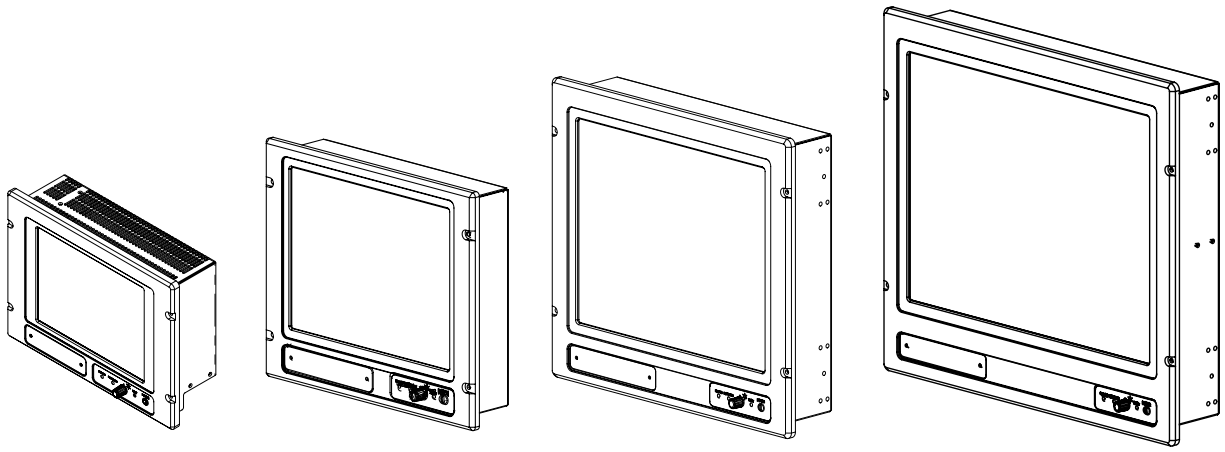
USER MANUAL



Maritime Multi Computer Models

JH 10T08 MMC - 10,4 inch Maritime Multi Computer
JH 15T05 MMC - 15,0 inch Maritime Multi Computer
JH 19T02 MMC - 19,0 inch Maritime Multi Computer
JH 23T02 MMC - 23,1 inch Maritime Multi Computer

User Manual MMC (ETX)	
Updated: 02 Oct 2006	Doc Id: INB100014-1 (Rev 15)
For models (including different options): -A1, -A2	Slim User Manual

jhd HATTELAND® DISPLAY
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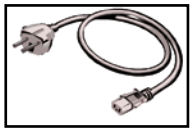
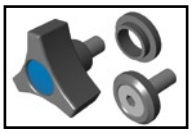
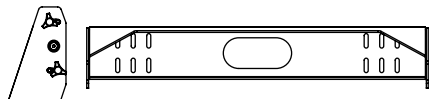
Contents of package

This product is shipped with:

Item	Description	Illustration
	Driver software CD(s) for factory installed components like mainboard, IDE, network etc.	
	1 pcs of Standard Power Cable. (European Type F “Schuko” or US Type B standard plug) Length 1.8m *Note: Power cable not included in the DC version.*	
	1 pcs of User Manual (Slim version) **Note**: The separate documentation for third party components are available on attached CD. The printed manual only covers specific information for Hatteland products, and not third party components.	
	1 pcs of configuration, test report and checklist sheets.	

Optional accessories for Panel Computers:

Item	Description	Illustration
	Bracket mounting kit: (Delivered only with optional bracket) 4 pcs of RenCol Tristar Knob Male - M6X10 mm 4 pcs of MicroPlastic - 6 mm Nylon washer. 4 pcs of Bolt with shoulder washer - M6X1X20 4 pcs of Flat washer	 Suspension Bracket

General

Jakob Hatteland Display AS

KNOWLEDGE - QUALITY - VALUE

Introduction to Jakob Hatteland Display AS

Founded in 1987, Jakob Hatteland Display (JHD) offers the widest range of type approved marine monitors, panel computers and type approved marine computers for the worldwide commercial, naval, yacht and cruise market.

Today the group develops and manufactures a complete range of IEC 60945 tested marine monitors, panel computers and IEC 60945 tested marine computers.

“Design meets Functionality” - Series 2

ATTRACTION is more then just to show a nice picture on a screen. The new IEC60945 tested man-machine interfaces, offered by Jakob Hatteland Display AS, will fulfill the customers wish for outstanding design combined with the reliability of approved maritime Panel-Computers and Displays.

These IP rated products are meant to be usable in all maritime applications. By the proven optical bonding technology, the Panel Computers and Displays show drastically reduced reflection and enhanced optical performance. This truly allows inside or outside use of these products.

Cool is not only the design, but also the product by intelligent heat dissipation and reduced heating storage. Using state-of-the-art components such as LCD-TFT Modules and ETX-PC bases industrial computers, long-term availability and serviceability is secured.

Flexibility in application and service friendliness is achieved by a unique backpack solution, whereas the detachable backpack contains the “intelligence” of the product.

The extreme small form factor used on this product line with a general depth of only 75mm (!) and for example for the 19in with 416 (W) x 372 (H) mm, allows new-builds and retrofit installation almost everywhere.

The flush mounted glass front shows only what is necessary: the content of the picture. The frameless design can smoothly be integrated into a console or it can be used as table mounted device (bracket version). A console version are also available for installment on flybridges with IP66 rating.

This new HATTELAND® Series 2 Panel Computers MMC2 and Displays MMD2 will be available from Q2 2006 onwards in 12in., 15in. and 19in. sizes. The concept allows easy scaling in sizes from small LCD screens up to large sizes of more than 32in LCD wide-screens. This outstanding and affordable product range offers a wide choice for different needs.

Approved Marine Displays (MMD/STD) - Series 1

Hatteland Display’s marine monitors are based on high quality and state-of-the-art components with the highest specifications, and meet all requirements for harsh maritime use. The displays are easily integrated into your system, due to standardized products and features.

The MMD (Maritime Multi Display) series consists of sizes ranging from 10in to 23in.

Specifically designed for navigation and automation systems on ships, these certified LCD monitors comply to IP66 described in IEC 60925, are tested according to IEC 60945 and are approved by major classification societies such as ABS, BV, ClassNK, DNV, GL and LR. Further to this marine standard, the 19in MMD, the 20in MMD and the 23in MMD marine monitors are also available as ECDIS and ARPA radar-compliant units.

Jakob Hatteland Display AS

Approved Marine Panel Computers (MMC) - Series 1

The combination of the reliable design of the marine TFT-LCD modules, together with industrial computer boards, allows Hatteland Display to offer a product range for customer applications where space is critical and full function is desired in a single unit. In particular, the standardized ETX-board form factor allows full flexibility when it comes to processor choice. Because of multiple useful standard components we can offer a highly attractive commercial package

The MMC (Maritime Multi Computer) series consist of sizes ranging from 10in to 23in.

These products have also been designed for typical marine applications in navigation, automation and other systems. Following Hatteland's philosophy, these marine panel computers are fully tested according to IEC 60945 and are designed for type approval.

Approved stand-alone and rack-mounted marine computers

Two concepts are followed to offer variation in size, function and expansion slots for customers: approved black-box computers for limited space and approved computers for standard 19in racks, which offer a high degree of expansion. Configurations according to customer wishes are implicit, such as the operating system, CD-burner, RAM, graphic card, HD, add-on cards, factory installed software and many, many more.

The approved computers are tested according to IEC 60945 and IACS E10 and meet the requirements for IEC 61174 (ECDIS). Several approvals by major classification societies such as ABS, BV, ClassNK, DNV, GL and LR are available or pending.

Flexible display solutions and night vision facilities

All JHD Type Approved displays, panel computers and marine computers provide maximum flexibility for customer applications. JHD offers all products with AC or DC power supply, and marine displays and marine panel computers have a fully linear dimmable function for night vision.

Upon customer request, specific color, mechanical and electrical function designs can be implemented. Many more options are also available such as, sun visors, mounting brackets, different Windows or Linux operating systems and touch screens. All products are designed and manufactured by JHD in Nedre Vats, Norway. The production and configuration of all products takes place within Hatteland's high capacity production plant#1 (opened in September 2003) in Nedre Vats, Norway.

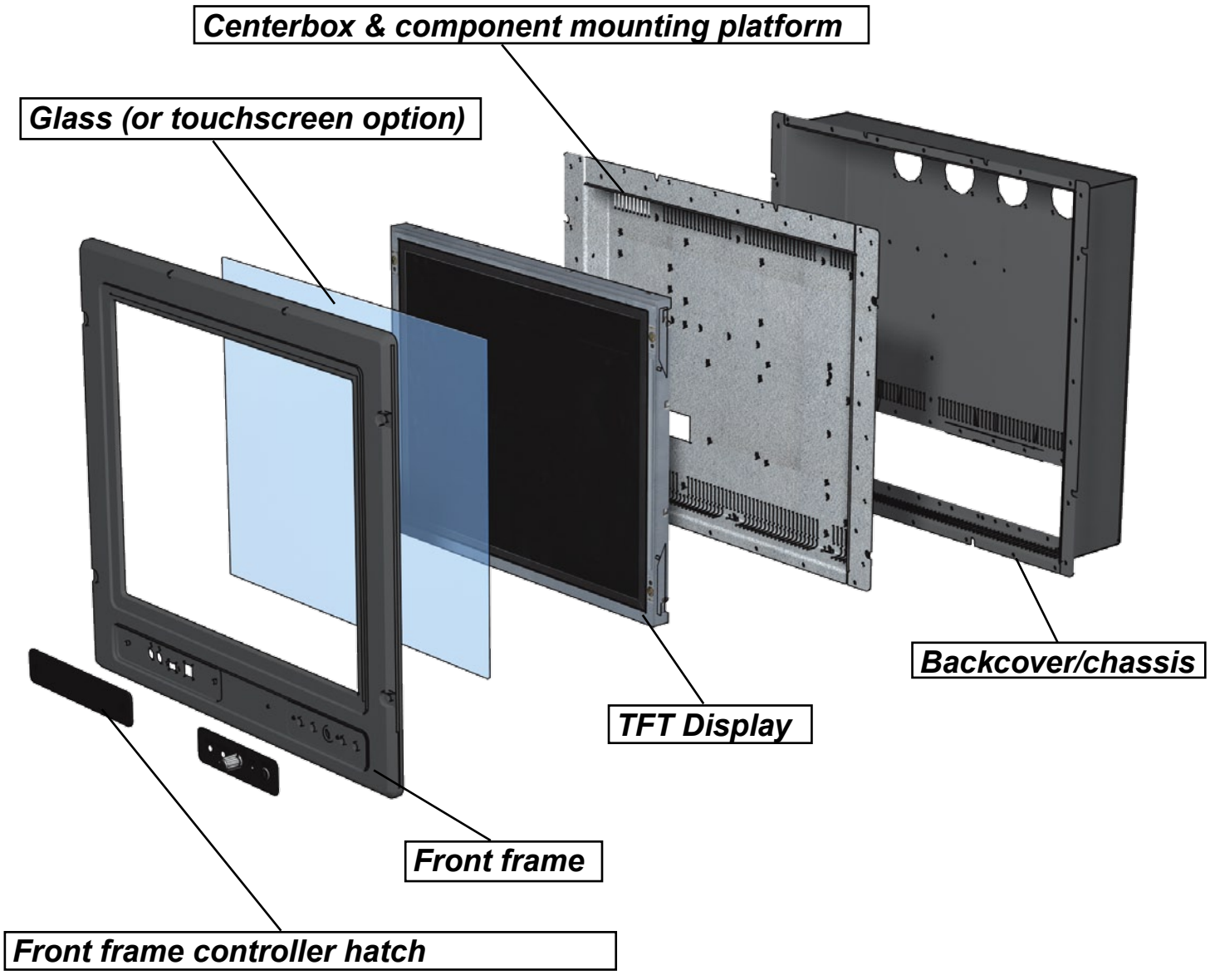
Hatteland's production facilities are designed for future expansion, which has enabled the creation of plant#2, our Optical Technology facility, opened in October 2006. The chosen materials for the production of our products are high grade industrial components able to fulfil form, fit and function requests.

About this manual

The manual contains electrical, mechanical and input/output signal specifications. All specifications in this manual, due to manufacturing, new revisions and approvals, are subject to change without notice. However, the last update and revision of this manual are shown both on the frontpage and also in the "Revision History" chapter. Please use that as a reference.

Furthermore, for third party datasheet and user manuals, please see dedicated interactive CD (where included) delivered with the product or contact our sales personnel for support. Please see the Contents Of Package chapter in the beginning of this manual to determine if a dedicated manual CD are included.

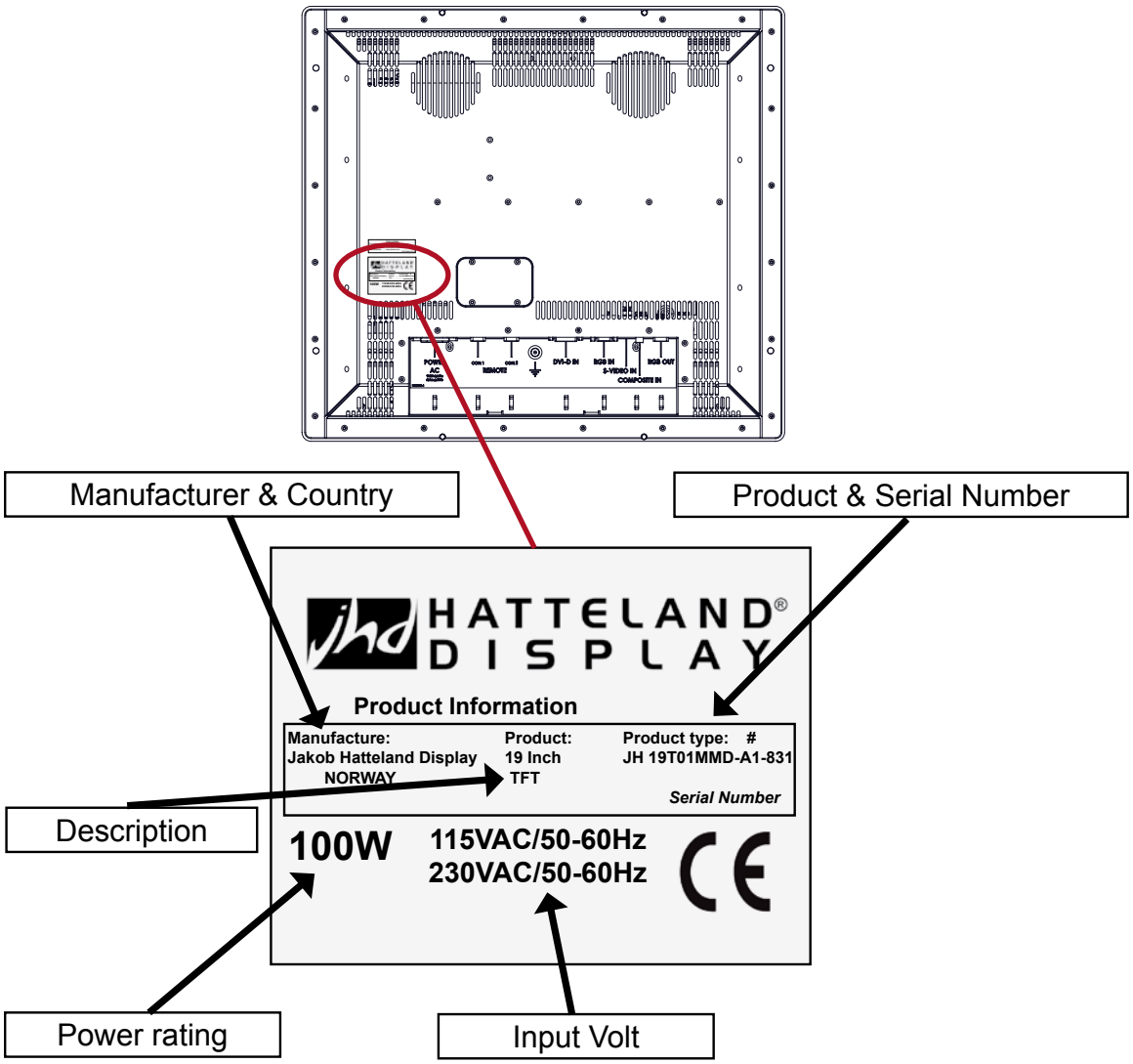
Basic Construction
Maritime Multi Computers



Illustration

Product Labels (Example)

Serial Number Label



Product Type and Serial Number

```
JH XXAXX AAA-AX-XXX  NOMENCLATURE
JH 19T01 MMD-A1-831  Example
                     Serial Number
                     Sub Version (AC-Odd / DC-Even number)
                     Version (Number & Product Name)
                     TFT (Thin Film Transistor)
                     Display Size (inch)
                     Jakob Hatteland (manufacturer)
```

Warranty Label

If you are to perform service on a unit still under warranty, any warranty will be void if this label is attempted removed/re-glued or removed completely. This label is usually located on the back of the product and near the serial number label. This is to help our service department to better determine if there has been any unauthorized service on a product still under warranty.

Touchscreen products

Introduction to Jakob Hatteland Display products with touchscreen
We use both Resistive and Capacitive touchscreen solutions for our products. Please visit our website to verify what product and touchscreen solution your product have.

Capacitive Touchscreen
Capacitive touchscreens operate using oscillator circuits that are located in each corner of the glass overlay and measure the capacitance of the area to be “touched”. Depending on where the user touches the overlay, the oscillators will vary in frequency. A touchscreen controller then measures the frequency variations to ascertain the coordinates of the person’s touch. This glass overlay has a coating that stores the charge deposited over its surface electrically. It will not operate with either a gloved hand or with a mechanical stylus.

CAPACITIVE - Brief Specifications

Subject	Details
Construction	**Top:** ClearTek protective overcoat protects the sensors and increase durability. **Inside:** Electrode X/Y grid pattern and conductive coating. **Bottom:** Glass and conductive coating. Small amount of voltage is applied to the four corners for measuring X and Y coordinates of the touch point.
Positional Accurancy	Reported touch coordinates are within 1.0% of true position. (Based on viewing area dimensions)
Touch Contact Requirements	3 ms for finger input.
Enduarance Tested	More than 225 million touches in one location without noticable degradation to the surface.
Cleaning	Water, isopropyl, alcohol, and similar non-abrasive cleaners.
Liquid Resistance	Liquids on screen does not impede touchscreen performance.
Light Transmission	Up to 88% at 550 nm; dependant on specific surface finish chosen.

Resistive Touchscreen
It generally uses a display overlay composed of layers, each with a conductive coating on the interior surface. Special separator “dots” are distributed evenly across the active area and separate the conductive interior layers. The pressure from using either a mechanical stylus or finger produces an internal electrical contact at the “action point” which supplies the controller with vertical and horizontal analog voltages for data input. The resistive touchscreens are anti-glare to reduce reflective shine intensity, which will slightly diffuse the light output throughout the screen. Resistive technology activation can be initiated by; a gloved hand, fingernail, mechanical stylus or an ungloved finger.

RESISTIVE - Brief Specifications

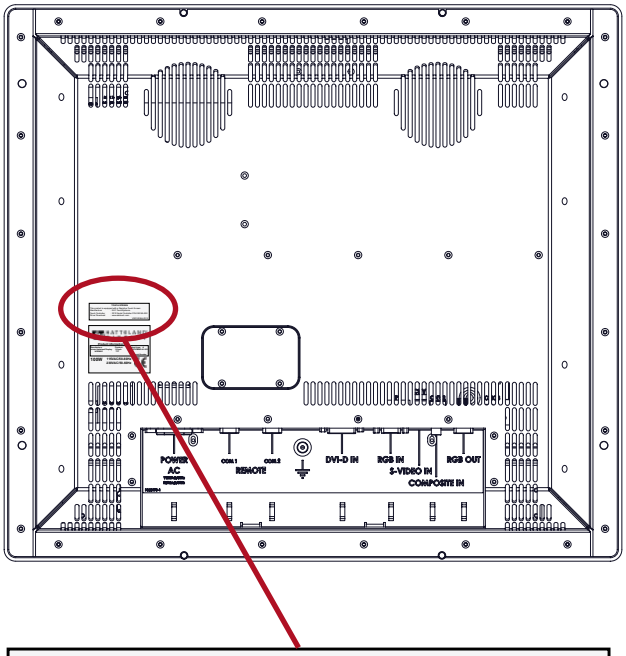
Subject	Details
Construction	**Top:** Polyester with outside hard-surface coating with clear or anti-glare finish. **Inside:** Transparent conductive coating. **Bottom:** Glass substrate with uniform conductive coating. Top and bottom layers separated by separator dots.
Positional Accurancy	Standard deviation of error is less than +- 0.080-inch (2mm).
Touch Activation Force	Typically 57 to 133 g
Expected Life Performance	More than 35 million touches in one location without failure, using a stylus similar to a finger.
Chemical Resistance (Exposed for one hour)	Acetone, Ammonia-based glass cleaners, Common food and beverages, Hexane, Isopropyl alcohol, Methylene chloride, Methyl ethyl ketone, Mineral spirits, Turpentine
Light Transmission	Typically 75% over visible light spectrum.

Touchscreen products

Location of Touchscreen label

Information about the factory mounted touchscreen and what driver to use, are indicated on the dedicated label. The location is shown in this illustration together with label example.

(This label is attached on products produced after September 2006)



TOUCH SCREEN
This product is equipped with a Resistive Touch Screen:
Manufacturer : ELO TouchSystems
Touch Controller : 2210 Serial Controller P/N 055165-000
Driver Download : www.elotouch.com
VSD100564-2210

Example label only

Up-2-date touchscreen drivers and documentation:
Please visit the 3rd party website as indicated on the label. You can also visit our website www.hatteland.com to view the full list of our models with touchscreen. Before using the touchscreen, it should be calibrated for your system. Please install the 3rd party software and use the Calibrate function from there.

Installation

General Installation Recommendations

Installation and mounting

1. Most of our products are intended for various methods of installation or mounting (panel mounting, bracket mounting, ceiling/wall mounting etc.); for details, please see the relevant mechanical drawings.

2. Adequate ventilation is a necessary prerequisite for the life of the product. The air inlet and outlet openings must definitely be kept clear; coverings which restrict ventilation are not permissible.

3. Do not install the unit in a horizontal position (laying down), as this will cause heat to build up inside the display which will damage the LCD Panel. To prevent this problem we recommend installing the unit in a vertical position (±30 degrees) to improve the airflow through the unit.

4. Exposure to direct sunlight can cause a considerable increase in the temperature of the unit, and might under certain circumstances lead to overtemperature. This point should already be taken into consideration when the bridge equipment is being planned (sun shades, distance from the windows, ventilation, etc.)

5. Space necessary for ventilation, for cable inlets, for the operating procedures and for maintenance, must be provided.

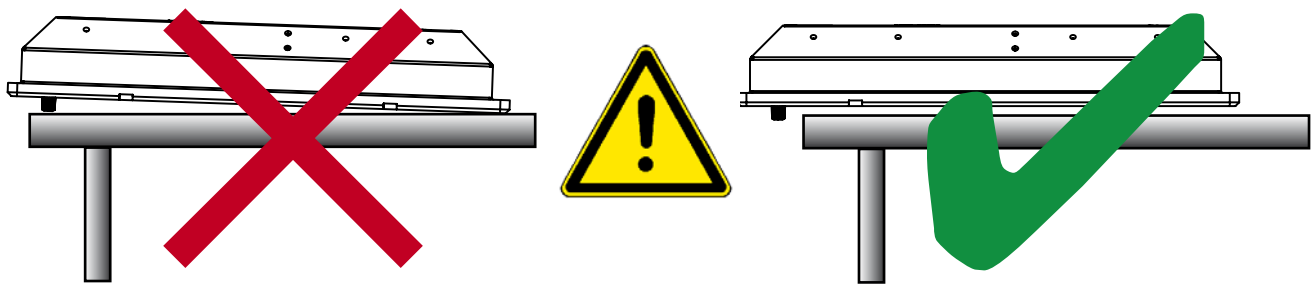
6. To further improve the cooling of the unit we recommend installing Cooling Fans underneath blowing upwards into the unit air inlet. This may be required in high temperature applications and also when there is reason to expect temperature problems due to non-optimal way of mounting(Ref.2-5).

7. If the push buttons of the product are not illuminated, an external, dimmable illumination (IEC 60945, 6.5.c, e.g. Goose neck light is required for navigational use.

8. Information about necessary pull-relievers for cables is given in the installation drawings. Attention must be paid to this information so that cable breaks will not occur, e.g. during service work.

Brightness knob precaution

Please be aware of the risk of breaking or bending the brightness knob. The brightness knob should be free of any obstruction.



General Installation Recommendations

Ergonomics

1. Adjust the unit height so that the top of the screen is at or below eye level. Your eyes should look slightly downwards when viewing the middle of the screen.

2. Adjust screen inclination to remain gaze angle to the centre of the screen approximately perpendicular to the line of gaze.

3. When products are to be operated both from a sitting position and from a standing position, a screen inclination of about 30° to 40° (from a vertical plane) has turned out to be favourable.

4. The brightness of displays is limited. Sunlight passing directly through the bridge windows - or its reflection - which falls upon the screen workplaces must be reduced by suitable means (negatively inclined window surfaces, Venetian blinds, distance from the windows, dark colouring of the deckhead)

5. Units in the bridge wing area must be installed or mounted by suitable alignment or bulkhead/ deckhead mounting in such a way that reflections of light from the front pane of the display are not directed into the observer's viewing direction.

6. The use of ordinary commercial filter plates or filter films is not permitted for items of equipment that require approval (by optical effects, "aids" of that kind can suppress small radar targets, for example).

General mounting instructions

- The useful life of the components of all Electronics Units generally decreases with increasing ambient temperature; it is therefore advisable to install such units in air-conditioned rooms. If there are no such facilities these rooms must at least be dry, adequately ventilated and kept at a suitable temperature in order to prevent the formation of condensation inside the display unit.

- With most Electronic Units, cooling takes place via the surface of the casing. The cooling must not be impaired by partial covering of the unit or by installation of the unit in a confined cabinet.

- In the area of the wheel house, the distance of each electronics unit from the magnetic standard compass or the magnetic steering compass must not be less than the permitted magnetic protection distance.

This distance is measured from the centre of the magnetic system of the compass to the nearest point on the corresponding unit concerned.

- Units which are to be used on the bridge wing must be installed inside the "wing control console" protected against the weather. In order to avoid misting of the viewing screen, a 25 ... 50 W console-heating (power depending on the volume) is recommended.

- When selecting the site of a display unit, the maximum cable lengths have to be considered.

General Installation Recommendations

- The impairment of read-out from a display screen by direct light from lamps or the sun must be avoided. Rear windows must be blacked out by means of roller blinds or Venetian blinds.

- Disturbing reflections on the screen of a display caused by pilot lamps and illuminated signs must be prevented by suitable measures (screening or relocating).

- When a product is being installed, the surface base or bulkhead must be checked to ensure that it is flat in order to avoid twisting of the unit when the fixing screws are tightened, because such twisting would impair mechanical functions. Any unevenness should be compensated for by means of spacing-washers.

- The grounding screws of the units must be connected to the body of the ship (ground); the wire used should have a cross sectional area of at least 6 mm^2.

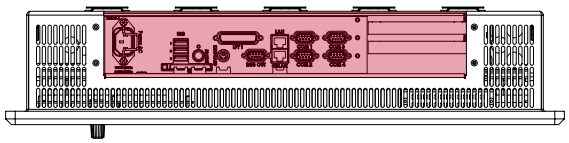
- Transportation damage, even if apparently insignificant at first glance, must immediately be examined and be reported to the freight carrier. The moment of setting-to-work of the equipment is too late, not only for reporting the damage but also for the supply of replacements.

Cables

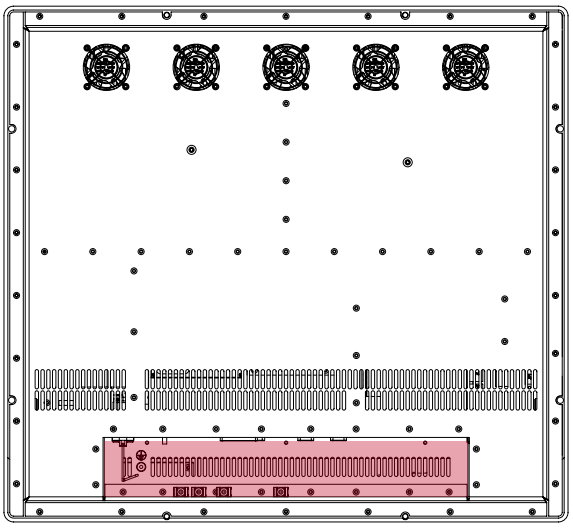
Use only high quality shielded signal cables. For RGB/DVI cables use only cables with separate coax for Red, Green and Blue. Jakob Hatteland Display can supply a varity of high quality RGB/DVI, RS232, PARALLEL, LAN and USB cables intended for this use.

Cable Entries & Connectors (Marked area) - Illustration only

Bottom View



Back View



General Installation Recommendations

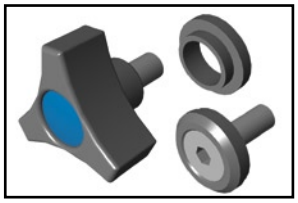
Maximum Cable Length
The RGB/DVI cable should generally be kept as short as possible to provide a high quality output on the display. The maximum cable length will depend on the signal resolution and frequency, but also on the quality of the signal output from the computer. We recommend using 60Hz vertical frequency for our displays.

Cables up to 10 meters generally provides good picture quality even with a 1600x1200 (UXGA) 60Hz signal. In most cases (especially with lower resolutions) even longer cables will provide a satisfactory result. This should however be tested in advance before making the decision on how far the unit can be placed from the signal source.

Standard Bracket
When mounting the bracket on the MMC products, USE only the provided bracket kit. Using any other or longer bolts may/or will do serious damage to components inside the product, and will void warranty! Use a Allen Wrench tool to fasten the middle bolts.

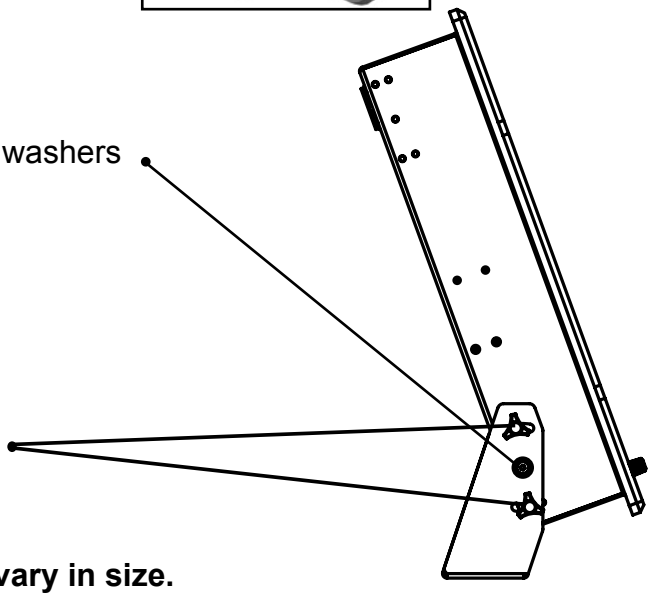
Please see the Technical Drawings section in this manual for additional information.

<u>Provided kit consists of:</u>
4 pcs of RenCol Tristar Knob Male - M6x10 mm
4 pcs of MicroPlastic - 6mm Nylon washer.
4 pcs of Bolt with shoulder washer - M6x1x20mm
4 pcs of Flat washer



Mount the bracket with the center bolt and washers on each side.

Mount the Tristar bolts on each side.
Adjust the tilting angle and secure all bolts.

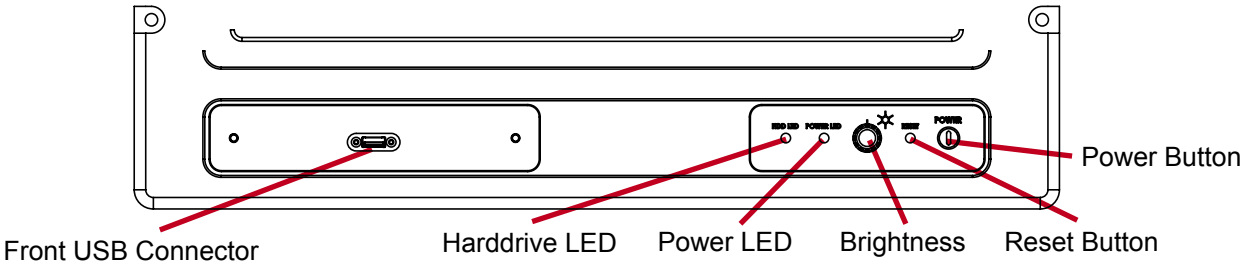


Note: MMC brackets for other products vary in size.

Operation

Physical Overview - MMC ETX

Front area of computer



FRONT USB4 INPUT/OUTPUT:

Supports any USB 2.0 (480Mbps) compliant peripherals. Drivers for most USB devices are useally included in operating system or on separate installation CD's delivered with product. USB 1.1 devices will operate in USB 1.1 mode (12 Mbps)

HDD LED

Harddrive LED (HDD LED):

The harddrive indication (LED) will turn orange when there occur read / write activity to / from the harddrive.

POWER LED

Power LED & Power Button:

To turn ON the computer, press down button and release it immediately. The power indication (LED) will turn green and any operating system will automatically boot. If the computer is in standby this LED will be red. To turn OFF the computer, press down this button and hold it for 3 seconds. The operating system may require additionally tasks to be performed before computer shuts down and turns off the unit.

Brightness:

The product features a 100% dimmable image, which means it is capable of displaying a completely black image when the brightness knob is turned fully to the left.

Note: If the display is delivered with Transflective Technology, the dimming may vary depending on environment. Transflective Technology uses environment / ambient lighting to preserve / enhance the brightness, meaning such products are very suitable for viewing in direct sunlight.

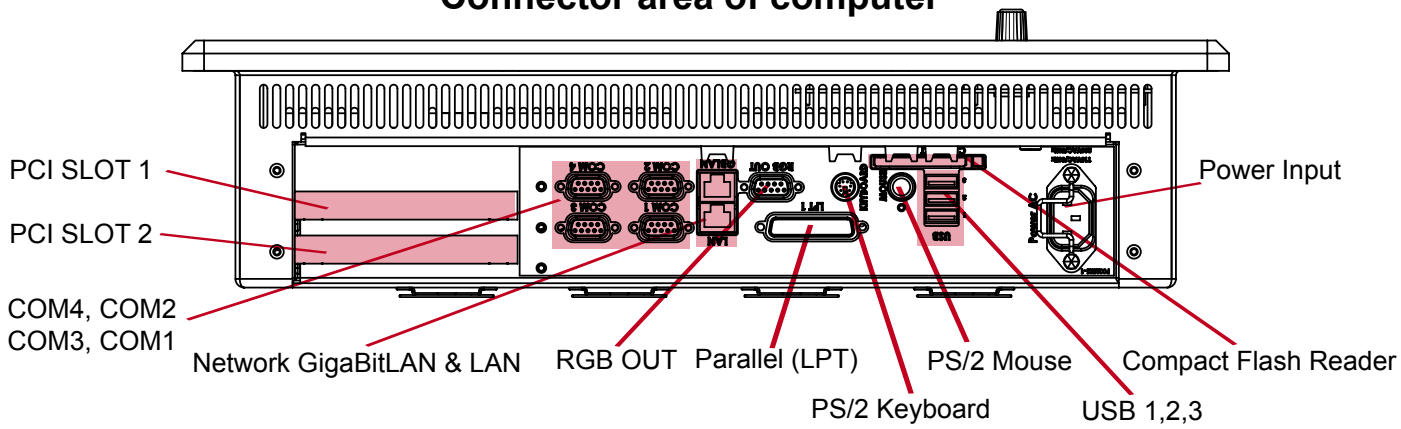
RESET

Reset Button: (Hard Reset)

To reset the computer in case of software failure, press this button (it is mounted inside, to access it use a screwdriver or a pen), This reset button is a hard reset which means the operating system will NOT be warned. Using this reset method may damage files and / or operating system in worst case scenarios. Precaution should be taken when using this.To perform a safe software reset, press either the power button, or use the operating system own reset functionality if possible.

Physical Overview - MMC ETX

Connector area of computer



NOTE: Available connectors / locations (may) vary depending on model !

PCI Slots 1&2: (Not available on all models!)

Supports PCI (Short Length / Standard Profile) card in two available slots. These PCI cards are normally installed from factory or returned to factory for upgrading if needed. Note that warranty will be void if you install PCI cards yourselves. In order to mount PCI cards, the chassis of the unit must be removed, thus making warranty void as the warranty sticker would have to be broken. The PCI slots are not available on all MMC ETX models, due to space restrictions.

COM1,2,3,4 Serial Ports INPUT/OUTPUT:

Supports RS232 / RS422 / RS485 using D-SUB 9P Male connectors. Fasten the cable to the connector using the provided screws on the cable housing itself. (Factory default is RS232 only)

Network INPUT/OUTPUT:

Supports 10/100Mbps Ethernet (LAN) and 10/100/1000Mbps Ethernet (GBLAN). Suitable for twisted pair cables CAT.5E. Make sure the network cable connector ”clicks” into the RJ-45 connector.

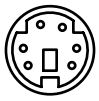
RGB OUTPUT:

Will output a clone signal from the computer for use with external display or monitor. Connects via a High Density D-SUB 15P Female connector. Fasten the cable to the connector using the provided screws on the cable housing itself.

LPT1 Parallel Port INPUT/OUTPUT:

Standard LPT1 Printer/Parallel (SPP/EPP/ECP) port using a D-SUB 25P Female connector. Fasten the cable to the connector using the provided screws on the cable housing itself.

Physical Overview - MMC ETX

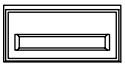


PS/2 Keyboard and PS/2 Mouse INPUTS:

Connect the PS/2 keyboard cable to the PS/2 5P Connector (female) marked with KEYBOARD.
Connect the PS/2 mouse cable to the PS/2 5P Connector (female) marked with MOUSE.

CompactFlash Reader:

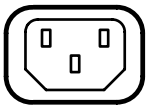
CompactFlash Reader supports Type I & II cards. Insert the card gently into the slot with the logo facing towards the TFT display (only when the unit is off). The card is removed by pressing the EJECT button next to the card slot. A wide range of card sizes are supported.
NOTE: DO NOT ATTEMPT TO REMOVE THE FLASH CARD WHILE THE UNIT IS OPERATING! This is because the CF Slot has been configured to operate as a IDE device. If the Flash Card is removed from the slot while the unit is on, data may be lost or partly corrupted.



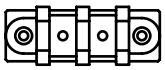
USB1,2,3 INPUT/OUTPUT:

Supports any USB1.1 (12Mbps) or USB2.0* (480Mbps) compliant peripherals. Drivers for most USB devices are useally included in operating system or on separate installation CD's delivered with product. USB 1.1 devices will operate in USB 1.1 mode (12 Mbps)
*Note: USB2.0 may not be supported on all MMC ETX models. Please review the specifications.

Power INPUT: (AC or DC Model)



AC MODEL ONLY:
The internal AC power module supports both 115VAC/60Hz and 230/50Hz power input using a standard IEC European power plug.



DC MODEL ONLY:
Secure the cables (check polarity!) to the screw terminal. The internal DC power module supports 24 VDC.

Specifications

Specifications - JH 10T08 MMC

Note: All specifications are subject to change without prior notice!

TFT Technology:

- 10.4 inch viewable image size
- Active Matrix, Thin Film Transistor (TFT)
- RGB vertical stripe

TFT Characteristics:

- Pixel number : 800 x 600
- Pixel pitch (RGB) : 0.264 (H) x 0.264 (V) mm
- Response Time : 10 ms (typical), "black" to "white"
- Contrast Ratio : 500:1 (typical)
- Light Intensity : 400 cd/m2 (typical)
- Viewable Angle : 40 deg. (Up), 60 deg. (Down/Left/Right)
  : (@ CR > 10)
- Active Display Area : 211.2 (H) x 158.4 (V) mm
- Max Colors : 262,144 (6-bit max)
- Resolutions : SVGA

Computer Specifications:

- Processor : Intel Pentium®M 1.1GHz, Low Voltage
- Cache / PCI Clock : 1MB Level 2 Cache / 400 MHz BUS
- System Chipset : Intel 82855GME
- BIOS : Phoenix 2Mbit Flash, Supports ACPI
- PC/104 Slot : 1 x PC/104 with ISA Support
- Memory Slot : 1 x SODIMM with ECC, (256MB->1GB)
- Graphics Chip : Intel 82855GME (Integrated/250MHz)
- IDE Controller : 1 x IDE Ports, Ultra DMA33/66/100
- IDE HDD Internal : Automotive 30GB, 2.5" IDE, 4200 RPM
- Compact Flash : 1 x CF Socket with Eject (Type I & II)
- Parallel Port (LPT) : 1 x EPP/ECP Port
- Primary Ethernet : 1 x 10/100 Mbps
- Secondary Ethernet : 1 x 10/100/1000 Mbps
- Serial Ports : 4 x RS232/422/485 (fully isolated)*
- USB Ports : 4 x USB (2.0 compliant, 480Mbps)
- Keyboard Port : 1 x PS/2
- Mouse Port : 1 x PS/2

** only in RS422/485 mode*

Power Specifications:

Power Supply Options:

- 115 & 230VAC - 50/60Hz : Model JH 10T08 MMC A1
- 24 VDC : Model JH 10T08 MMC A2

Power Consumption:

- Operating : 100W (max) (Configuration depending)
  : 65W (typ) (Max backlight & high CPU load)

Available Technical Options:

Miscellaneous Options:

- Audio AC97 Compliant : Line In/Out, Mic In, Speaker Out

Physical Dimensions:

- 339 (W) x 256 (H) x 91 (D) mm
- Weight: 7 kg (approx)

User Controls:

On front bezel:

- Power On/Off (push button)
- Brightness Control
- Power LED, HD Led and Reset button

Behind hatch:

- USB 2.0 connector

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  Humidity 30% to 90% (non condensing)
- Storage : Temperature -20 deg. C to +70 deg. C
  Humidity 10% to 90% (non condensing)

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Function	Back side	Inside	Front
Ethernet Lan/GBLan	2 x RJ-45		
PC/104 Slot		1 x PC/104 Slot	
Keyboard	1 x PS/2		
Mouse	1 x PS/2		
Compact Flash	1 x CF Socket		
COM 1	1 x DB9M		
COM 2	1 x DB9M		
COM 3	1 x DB9M		
COM 4	1 x DB9M		
LPT1	1 x DB25F		
USB2.0	3 x USB		1 x USB
AC Power	Std IEC inlet (Odd version models)		
DC Power	DC Screw terminal (Even version models)		
RGB Out	1 x DB15HDF		
Line In/Out	3.5mm mini jack (depends on model)		
Mic In	3.5mm mini jack (depends on model)		

Available Mechanical Options:

Accessories:

- JH 10TSV : Sun visor *
- JH 10TBRMMC : Bracket *
- Touch Screen **

** Option: Standard or custom logo and color*
*** Option: Factory mounted*

Compass Safe Distance: JH 10T08 MMC Standard: 55cm Steering: 40cm

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
IACS E10

Specifications - JH 15T05 MMC

Note: All specifications are subject to change without prior notice!

TECHNICAL DESCRIPTION

TFT Technology:

- 15.0 inch viewable image size
- Color Active Matrix LCD Module
- a-Si Thin Film Transistor (TFT)

TFT Characteristics:

- Pixel number : 1024 x 768
- Pixel pitch (RGB) : 0.297 (H) x 0.297 (V) mm
- Response Time : 25 ms (typical), "black" to "white"
- Contrast Ratio : 400:1 (typ)
- Light Intensity : 250 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (min) (Up/Down/Left/Right)
  : (@ CR > 10)
- Active Display Area : 304.1 (H) x 228.1 (V) mm
- Max Colors : 16.7 millions
- Resolutions : XGA

Computer Specifications:

- Processor : Intel Pentium M 1.1GHz, Low Voltage
- Cache / PCI Clock : 1MB Level 2 Cache / 400 MHz BUS
- System Chipset : Intel 82855GME
- BIOS : Phoenix 2Mbit Flash, Supports ACPI
- PC/104 Slot : 1 x PC/104 with ISA Support
- Memory Slot : 1 x SODIMM with ECC, from 256MB -> 1GB
- Graphics Chip : Intel 82855GME (Integrated/250MHz)
- IDE Controller : 1 x IDE Ports, Ultra DMA33/66/100
- IDE HDD Internal : Automotive 30GB, 2.5" IDE, 4200 RPM
- Compact Flash : 1 x CF Socket with Eject (Type I & II)
- Parallel Port (LPT) : 1 x EPP/ECP Port
- Primary Ethernet : 1 x 10/100 Mbps
- Secondary Ethernet: 1 x 10/100/1000 Mbps
- Serial Ports : 4 x RS232/RS422/RS485 (fully isolated)*
- USB Ports : 4 x USB (2.0 compliant, 480Mbps)
- Keyboard Ports : 1 x PS/2
- Mouse Ports : 1 x PS/2
- Supported TFT Res.: 800 x 600 & 1024 x 768**
- RGB OUT Res. : 640x480, 768x1024, 800x600, 1024x768, 1024x1280, 1200x1600, 1280x1024, 1600x1200

** only in RS422/485 mode* *** Recommended 1024 x 768 @ 60 Hz*

Power Specifications:

Power Supply Options:

- 115 & 230VAC - 50 / 60Hz : Model JH 15T05 MMC A1
- 24 VDC : Model JH 15T05 MMC A2

Power Consumption:

- Operating : 100W (max) (Configuration depending)
  : 65W (typ) (Max backlight & high CPU load)

Available Technical Options:

Miscellaneous Options:

- Audio AC97 Compliant : Line In/Out, Mic In, Speaker Out
- TV-Out : 1 x Composite (Depends on model)

MECHANICAL DESCRIPTION

Physical Dimensions:

- 412 (W), 345 (H), 83.5 (D) mm
- Weight: 8 kg (approx)

User Controls:

On front bezel:

- Power On/Off (push button)
- Brightness Control
- Power LED, HD Led and Reset button

Behind hatch:

- USB 2.0 connector(s)

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  Humidity 30% to 90% (non condensing)
- Storage : Temperature -20 deg. C to +70 deg. C
  Humidity 10% to 90% (non condensing)

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Function	Back side	Inside	Front
Ethernet Lan/GBLan	2 x RJ-45		
PC/104 Slot		1 x PC/104 Slot	
Keyboard	1 x PS/2		
Mouse	1 x PS/2		
Compact Flash	1 x CF Socket		
COM 1	1 x DB9M		
COM 2	1 x DB9M		
COM 3	1 x DB9M		
COM 4	1 x DB9M		
LPT1	1 x DB25F		
USB2.0	3 x USB		1 x USB
AC Power	Std IEC inlet (Odd version models)		
DC Power	DC Screw terminal (Even version models)		
RGB Out	1 x DB15HDF		
TV Out	Composite RCA (depends on model)		
Line In/Out	3.5mm mini jack (depends on model)		
Mic In	3.5mm mini jack (depends on model)		

Available Mechanical Options:

Accessories:

- JH 15TSV : Sun visor *
- JH 15TBRMMC : Bracket *
- Touch Screen **

** Option: Standard or custom logo and color*
*** Option: Factory mounted*

Compass Safe Distance: JH 15T05 MMC Standard: 125cm Steering: 80cm

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies: (1=AC Ver & 2=DC Ver)

EN60945 4th (IEC945 4th) (1,2)
IACS E10 (1,2)
ABS - American Bureau of Shipping (1,2)
ClassNK - Nippon Kaiji Kyokai (2)
GL - Germanischer Lloyd (1,2)
LRS - Lloyd's Register of Shipping (1)
DNV - Det Norske Veritas (1,2)
BV - Bureau Veritas (1,2)

Specifications - JH 19T02 MMC

Note: All specifications are subject to change without prior notice!

TECHNICAL DESCRIPTION

TFT Technology:

- 19.0 inch viewable image size
- Active Matrix, Thin Film Transistor (TFT)
- MVA Premium™ Technology

TFT Characteristics:

- Pixel number : 1280 x 1024
- Pixel pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 15 ms (typical), "black" to "white"
- Contrast Ratio : 700:1 (typ)
- Light Intensity : 300 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (min) (Up/Down/Left/Right)
  : (@ CR > 10)
- Active Display Area : 376.32 (H) x 301.056 (V) mm
- Max Colors : 16.7 millions
- Resolutions : SXGA

Computer Specifications:

- Processor : Intel Pentium®M 1.1GHz, Low Voltage
- Cache / PCI Clock : 1MB Level 2 Cache / 400 MHz BUS
- System Chipset : Intel 82855GME
- BIOS : Phoenix 2Mbit Flash, Supports ACPI
- PCI Slot (Limited height): 2 x Short Length, STD Profile, 32Bit PCI
- PC/104 Slot : 1 x PC/104 with ISA Support
- Memory Slot : 1 x SODIMM with ECC, from 256MB -> 1GB
- Graphics Chip : Intel 82855GME (Integrated/250MHz)
- IDE Controller : 1 x IDE Ports, Ultra DMA33/66/100
- IDE HDD Internal : Automotive 30GB, 2.5" IDE, 4200 RPM
- Compact Flash : 1 x CF Socket with Eject (Type I & II)
- Parallel Port (LPT) : 1 x EPP/ECP Port
- Primary Ethernet : 1 x 10/100 Mbps
- Secondary Ethernet: 1 x 10/100/1000 Mbps
- Serial Ports : 4 x RS232/RS422/RS485 (fully isolated)*
- USB Ports : 4 x USB (2.0 compliant, 480Mbps)
- Keyboard Ports : 1 x PS/2
- Mouse Ports : 1 x PS/2
- Supported TFT Res.: From 800 x 600 up to 2048 x 1536**
- RGB OUT Res : 768x1024, 800x600, 1024x768, 1024x1280, 1200x1600, 1280x1024, 1600x1200

** only in RS422/485 mode ** Recommended 1280 x 1024 @ 60Hz*

Power Specifications:

Power Supply Options:

- 115 & 230VAC - 50 / 60Hz : Model JH 19T02 MMC A1
- 24 VDC : Model JH 19T02 MMC A2

Power Consumption:

- Operating : 100W (max) (Configuration depending)
  : 75W (typ) (Max backlight & high CPU load)

Available Technical Options:

Miscellaneous Options:

- Audio AC97 Compliant : Line In/Out, Mic In, Speaker Out (2W)
- TV-Out : 1 x Composite (Depends on model)

MECHANICAL DESCRIPTION

Physical Dimensions:

- 483 (W), 444 (H), 100 (D) mm
- Weight: 11 kg (approx)

User Controls:

On front bezel:

- Power On/Off (push button)
- Brightness Control
- Power LED, HD Led and Reset button

Behind hatch:

- USB 2.0 connector

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  Humidity 30% to 90% (non condensing)
- Storage : Temperature -20 deg. C to +70 deg. C
  Humidity 10% to 90% (non condensing)

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Function	Back side	Inside	Front
Ethernet Lan/GBLan	2 x RJ-45		
PCI Slot (Limited height)		2 x Short/STD	
PC/104 Slot		1 x PC/104 Slot	
Keyboard	1 x PS/2		
Mouse	1 x PS/2		
Compact Flash	1 x CF Socket		
COM 1	1 x DB9M		
COM 2	1 x DB9M		
COM 3	1 x DB9M		
COM 4	1 x DB9M		
LPT1	1 x DB25F		
USB2.0	3 x USB		1 x USB
AC Power	Std IEC inlet (Odd version models)		
DC Power	DC Screw terminal (Even version models)		
RGB Out	1 x DB15HDF		
TV Out	Composite RCA (depends on model)		
Line In/Out	3.5mm mini jack (depends on model)		
Mic In	3.5mm mini jack (depends on model)		
Speaker Out	3.5mm mini jack (depends on model)		

Available Mechanical Options:

Accessories:

- JH 19TSV : Sun visor *
- JH 19TBRMMC-B1 : Bracket*
- Touch Screen **

** Option: Standard or custom logo and color*
*** Option: Factory mounted*
** Option: See separate datasheet for bracket drawings.*

Compass Safe Distance: JH 19T02 MMC Standard: 75cm Steering: 55cm

APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies: (1=AC Ver & 2=DC Ver)

EN60945 4th (IEC945 4th) (1,2)
IACS E10 (1,2)
ABS - American Bureau of Shipping (1,2)
ClassNK - Nippon Kaiji Kyokai (2)
GL - Germanischer Lloyd (1,2)
LRS - Lloyd's Register of Shipping (1)
DNV - Det Norske Veritas (1,2)
BV - Bureau Veritas (1,2)

Specifications - JH 23T02 MMC

Note: All specifications are subject to change without prior notice!

TECHNICAL DESCRIPTION

TFT Technology:

- 23.1 inch viewable image size
- Thin Film Transistor (TFT)
- MVA Premium™ Technology

TFT Characteristics:

- Pixel number : 1600 x 1200
- Pixel pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 20 ms (typical), "black" to "white"
- Contrast Ratio : 600:1 (typ)
- Light Intensity : 250 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (min) (Up/Down/Left/Right)
  : (@ CR > 10)
- Active Display Area : 470.4 (H) x 352.8 (V) mm
- Max Colors : 16.7 millions (depending on graphics card)
- Resolutions : UXGA

Computer Specifications:

- Processor : Intel Pentium®M 1.1GHz, Low Voltage
- Cache / PCI Clock : 1MB Level 2 Cache / 400 MHz BUS
- System Chipset : Intel 82855GME
- BIOS : Phoenix 2Mbit Flash, Supports ACPI
- PCI Slot : 2 x Short Length, STD Profile, 32Bit PCI
- PC/104 Slot : 1 x PC/104 with ISA Support
- Memory Slot : 1 x SODIMM with ECC, from 256MB -> 1GB
- Graphics Chip : Intel 82855GME (Integrated/250MHz)
- IDE Controller : 1 x IDE Ports, Ultra DMA33/66/100
- IDE HDD Internal : Automotive 30GB, 2.5" IDE, 4200 RPM
- Compact Flash : 1 x CF Socket with Eject (Type I & II)
- Parallel Port (LPT) : 1 x EPP/ECP Port
- Primary Ethernet : 1 x 10/100 Mbps
- Secondary Ethernet: 1 x 10/100/1000 Mbps
- Serial Ports : 4 x RS232/RS422/RS485 (fully isolated)*
- USB Ports : 4 x USB (2.0 compliant, 480Mbps)
- Keyboard Ports : 1 x PS/2
- Mouse Ports : 1 x PS/2

** only in RS422/485 mode*

Power Specifications:

Power Supply Options:

- 115 & 230VAC - 50 / 60Hz : Model JH 23T02 MMC A1
- 24 VDC : Model JH 23T02 MMC A2*

*(tests pending)

Power Consumption:

- Operating : 100W (max) (Configuration depending)
  : 75W (typ) (Max backlight & high CPU load)

Available Technical Options:

Miscellaneous Options:

- Audio AC97 Compliant : Line In/Out, Mic In, Speaker Out
- TV-Out : 1 x Composite (Depends on model)

MECHANICAL DESCRIPTION

Physical Dimensions:

- 584 (W), 534 (H), 105 (D) mm
- Weight: 18 kg (approx)

User Controls:

On front bezel:

- Power On/Off (push button)
- Brightness Control
- Power LED, HD Led and Reset button

Behind hatch:

- USB 2.0 connector

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  Humidity 30% to 90% (non condensing)
- Storage : Temperature -20 deg. C to +70 deg. C
  Humidity 10% to 90% (non condensing)

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input/Output Connectors:

Function	Back side	Inside	Front
Ethernet Lan/GBLan	2 x RJ-45		
PCI Slot		2 x Short/STD	
PC/104 Slot		1 x PC/104 Slot	
Keyboard	1 x PS/2		
Mouse	1 x PS/2		
Compact Flash	1 x CF Socket		
COM 1	1 x DB9M		
COM 2	1 x DB9M		
COM 3	1 x DB9M		
COM 4	1 x DB9M		
LPT1	1 x DB25F		
USB2.0	3 x USB		1 x USB
AC Power	Std IEC inlet (Odd version models)		
DC Power	DC Screw terminal (Even version models)		
RGB Out	1 x DB15HDF		
TV Out	Composite RCA (depends on model)		
Line In/Out	3.5mm mini jack (depends on model)		
Mic In	3.5mm mini jack (depends on model)		

Available Mechanical Options:

Accessories:

- JH 23TSV : Sun visor *
- JH 23TBRMMC-B1 : Bracket*
- Touch Screen **

** Option: Standard or custom logo and color*
** Option: See separate datasheet for bracket specifications.*
*** Option: Factory mounted*

Compass Safe Distance: JH 23T02 MMC Standard: 175cm Steering: 140cm

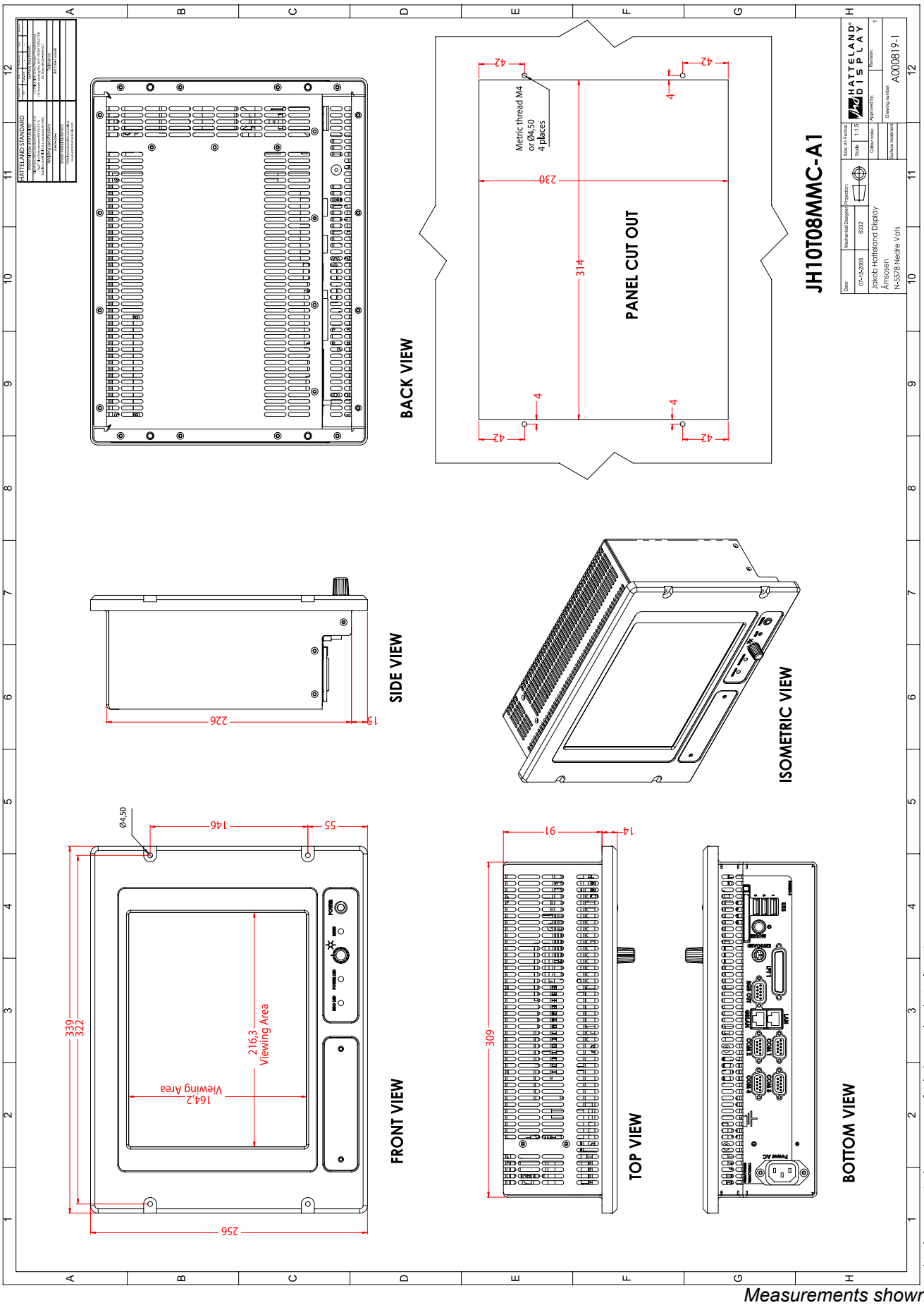
APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
IACS E10

Technical Drawings

Technical Drawings - JH 10T08 MMC



Due to dimensions without decimals, the tolerance on drawings is +/- 1mm (For accurate measurements, measure in AutoCAD)
Technical drawings (.DWG format) are found on our internet site: http://www.hatteland.com

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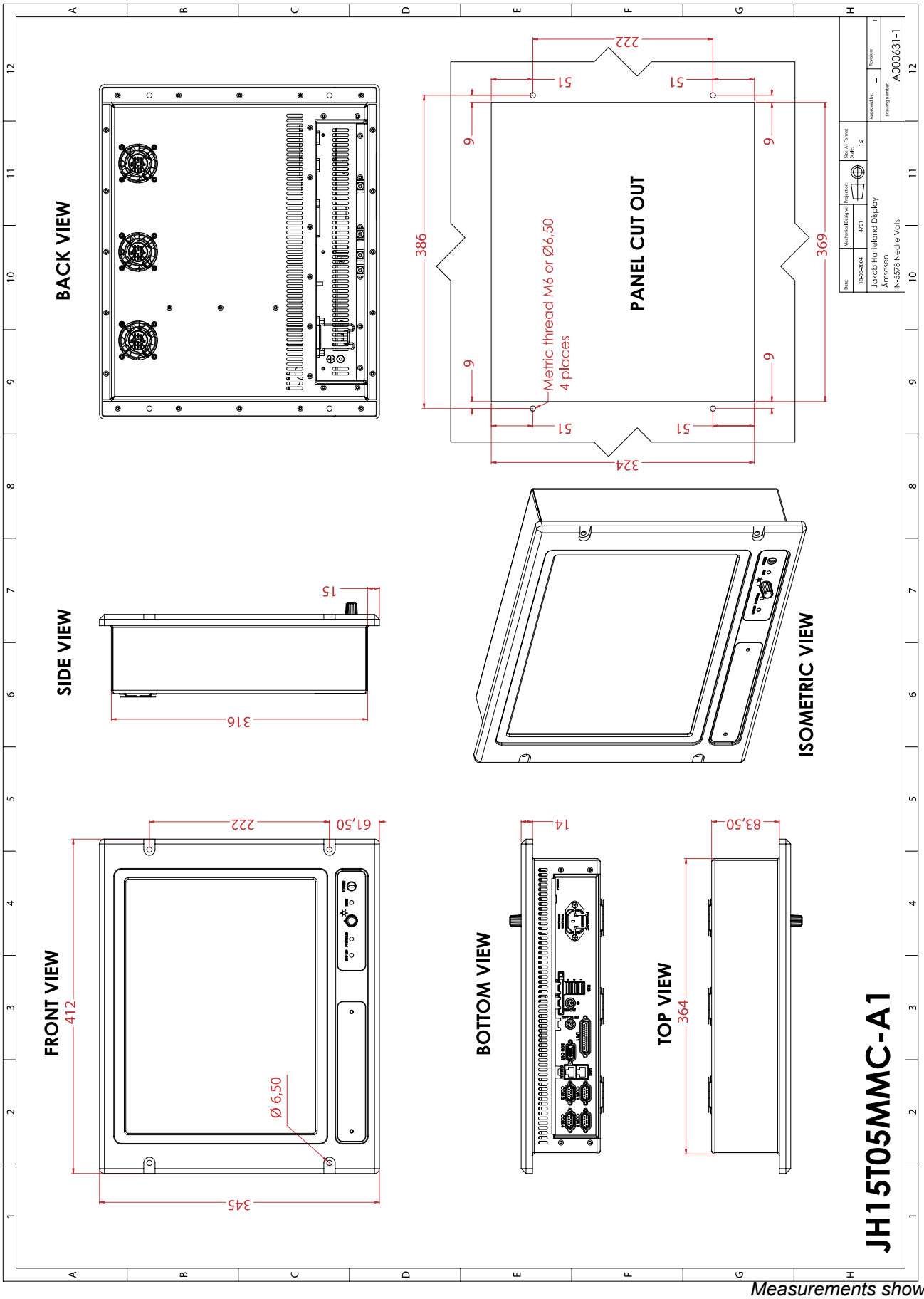
Measurements shown in mm

Technical Drawings - JH 15T05 MMC



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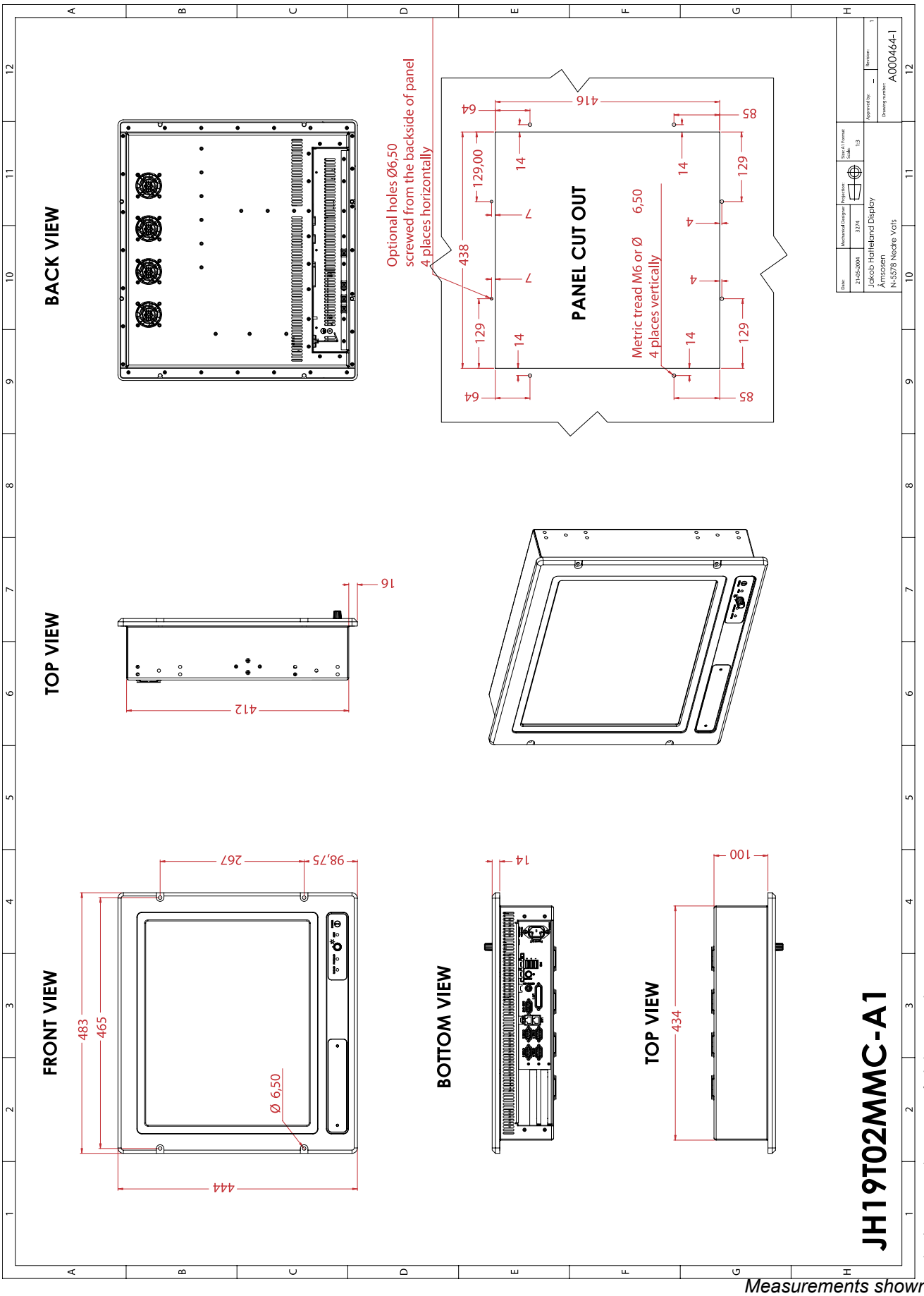
Measurements shown in mm

Technical Drawings - JH 19T02 MMC



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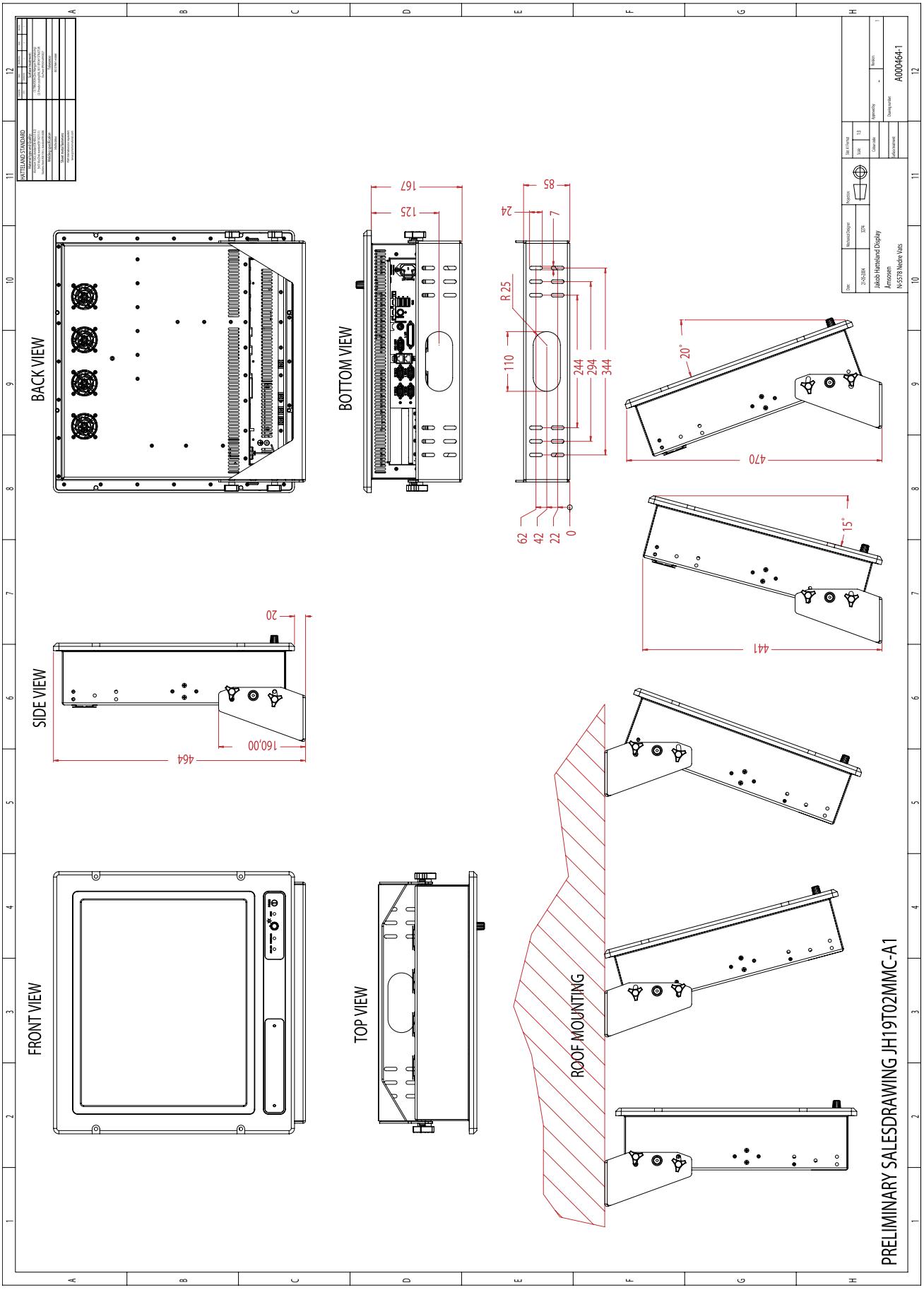
Measurements shown in mm

Technical Drawings - JH 19T02 MMC



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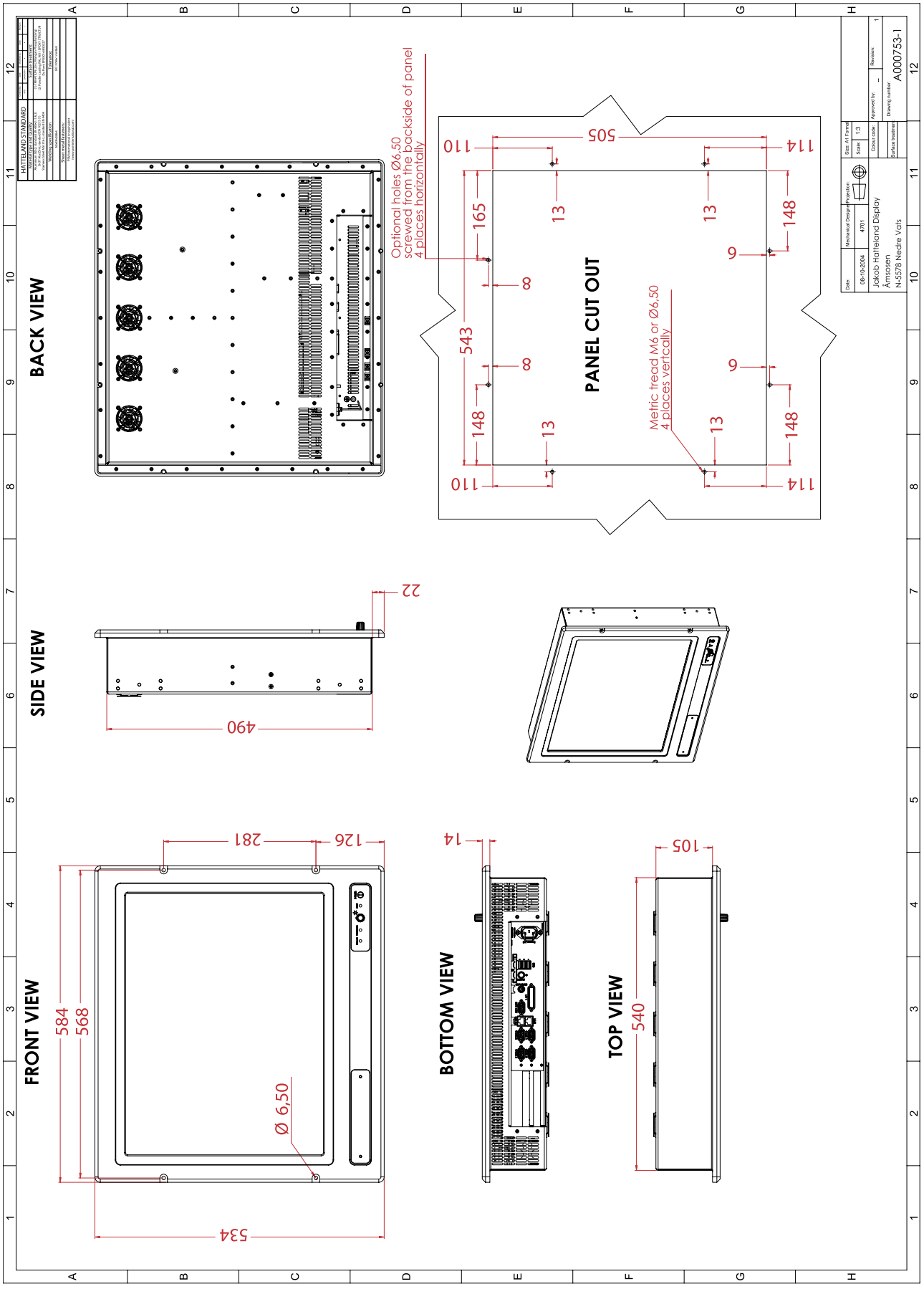
Technical Drawings - JH 23T02 MMC



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Technical drawings (.DWG format) are found on our internet site: http://www.hatteland.com

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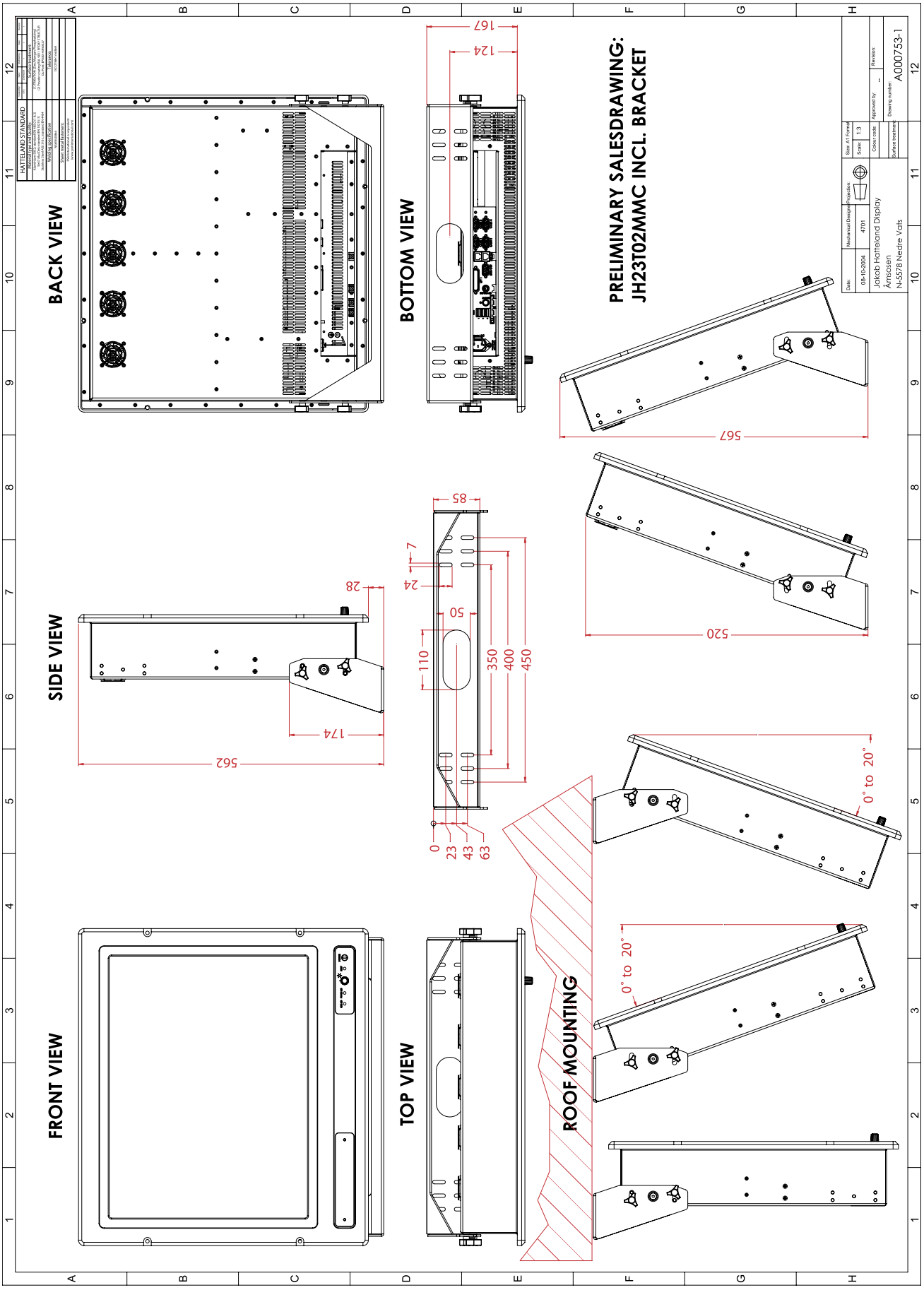
Measurements shown in cm

Technical Drawings - JH 23T02 MMC



Due to dimensions without decimals, the tolerance on drawings is +/- 1mm (For accurate measurements, measure in AutoCAD)
Technical drawings (.DWG format) are found on our internet site: http://www.hatteland.com

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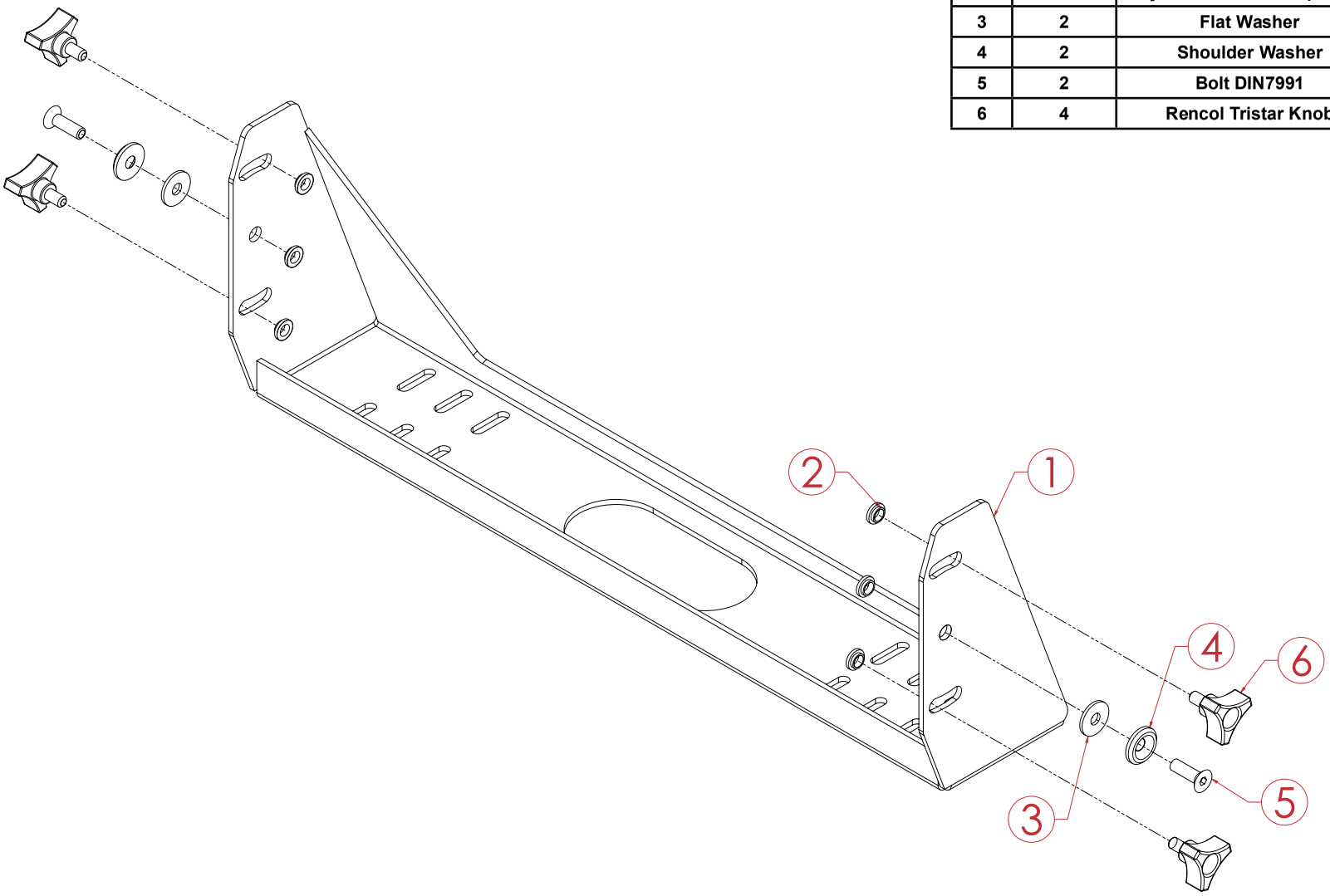
Technical Drawings - Accessories

IND100132-78

MMC ETX Bracket 40 INB100014-1 (Rev 15)

POS	NUMBER	DESCRIPTION	SIZE
1	1	Suspension Bracket	
2	6	Nylon Washer Microplastic	6mm
3	2	Flat Washer	6 mm
4	2	Shoulder Washer	6 mm
5	2	Bolt DIN7991	M6X1X20
6	4	Rencol Tristar Knob	M6X10 mm



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Date:	Mechanical Designer	Projection:	Size: A1 Format Scale: 1:1	
Jakob Hatteland Display Åmsosen N-5578 Nedre Vat			Approved by:	Revision:
			Drawing number:	

Technical Drawings - Accessories

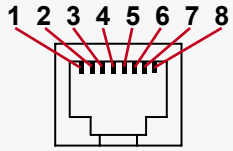
HATTELAND

Appendixes

Pin Assignments - Common Connectors

Note: Not all connectors may be available on your specific product. This depends on the amount of additional hardware installed from factory, or customized solutions. These pin assignments are for the common connectors used. Connectors are seen from users Point Of View (POV).

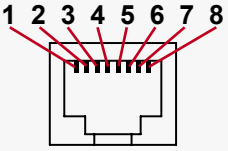
Pin Assignments - RJ45 10/100 LAN



Pin 01 - TDP	Transmit Differential Pair (Positive)
Pin 02 - TDN	Transmit Differential Pair (Negative)
Pin 03 - RDP	Receive Differential Pair (Positive)
Pin 04 - NC	Not Connected
Pin 05 - NC	Not Connected
Pin 06 - RDN	Receive Differential Pair (Negative)
Pin 07 - NC	Not Connected
Pin 08 - NC	Not Connected

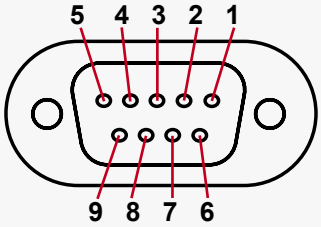
Use category 5 - twisted pair cable

Pin Assignments - RJ45 10/100/1000 GBLAN



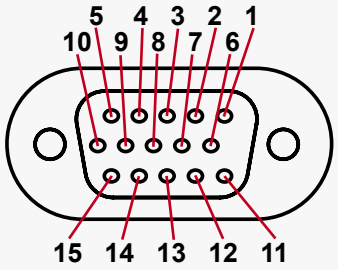
Pin 01 - D0P	Differential Pair 0 (Positive)
Pin 02 - D0N	Differential Pair 0 (Negative)
Pin 03 - D1P	Differential Pair 1 (Positive)
Pin 04 - D2P	Differential Pair 2 (Positive)
Pin 05 - D2N	Differential Pair 2 (Negative)
Pin 06 - D1N	Differential Pair 1 (Negative)
Pin 07 - D3P	Differential Pair 3 (Positive)
Pin 08 - D3N	Differential Pair 3 (Negative)

Pin Assignments - 9P Serial COM RS232



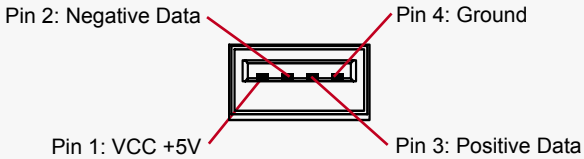
Pin 01 - DCD	Data Carry Detect
Pin 02 - SIN	Serial In or Receive Data
Pin 03 - SOUT	Serial Out or Transmit Data
Pin 04 - DTR	Data Terminal Ready
Pin 05 - GND	Ground
Pin 06 - DSR	Data Set Ready
Pin 07 - RTS	Request To Send
Pin 08 - CTS	Clear To Send
Pin 09 - RI	Ring Indicate

Pin Assignments - 15P HD RGB VGA

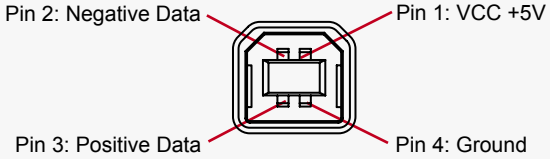


Pin 01	Red, analog
Pin 02	Green, analog
Pin 03	Blue, analog
Pin 04	Reserved for monitor ID bit 2 (grounded)
Pin 05	Digital ground
Pin 06	Analog ground red
Pin 07	Analog ground green
Pin 08	Analog ground blue
Pin 09	+5V power supply for DDC (optional)
Pin 10	Digital ground
Pin 11	Reserved for monitor ID bit 0 (grounded)
Pin 12	DDC serial data
Pin 13	Horizontal sync or composite sync, input
Pin 14	Vertical sync, input
Pin 15	DDC serial clock

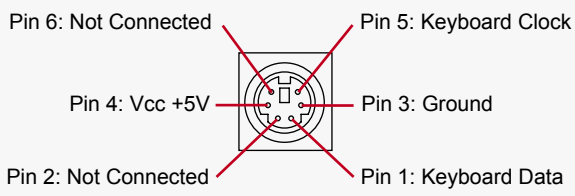
Pin Assignments - USB TYPE A



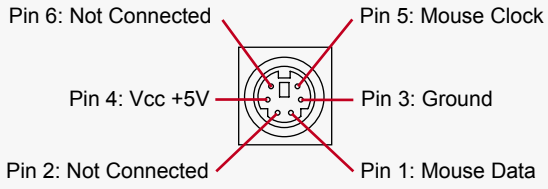
Pin Assignments - USB TYPE B



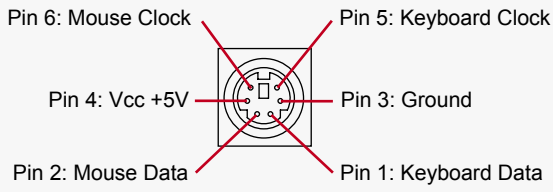
Pin Assignments - 5P PS/2 KEYBOARD



Pin Assignments - 5P PS/2 MOUSE

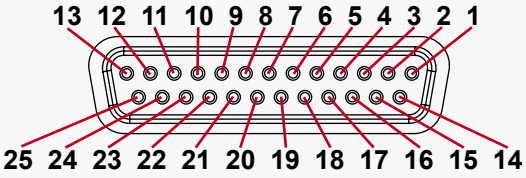


Pin Ass. - 5P PS/2 KEYBOARD+MOUSE Combined



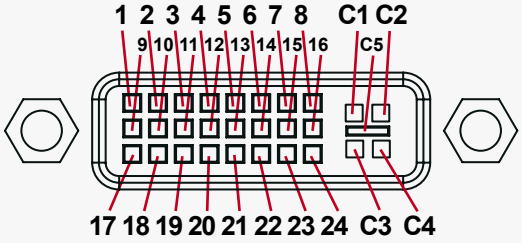
Pin Assignments - Common Connectors

Pin Assignments - 25P Parallel



Pin 01 - STROBE	This signal indicates to the printer that data at PD7..0 are valid.
Pin 02 - DATA0	Parallel data bus from PC board to printer. The data line are able to operate in PS/2 compatible bi-directional mode.
Pin 03 - DATA1	Same as Pin 02
Pin 04 - DATA2	Same as Pin 02
Pin 05 - DATA3	Same as Pin 02
Pin 06 - DATA4	Same as Pin 02
Pin 07 - DATA5	Same as Pin 02
Pin 08 - DATA6	Same as Pin 02
Pin 09 - DATA7	Same as Pin 02
Pin 10 - ACK	Signal from printer indicating that the printer has received the data and is ready to accept further data.
Pin 11 - BUSY	Signal from printer indicating that the printer cannot accept further data.
Pin 12 - PE	Signal from printer indicating that the printer is out of paper.
Pin 13 - SELECT	Signal from printer to indicate that the printer is selected.
Pin 14 - AUTO FEED	This active low output causes the printer to add a line feed after each line printed.
Pin 15 - ERR#	Signal from printer indicating that an error has been detected.
Pin 16 - INIT#	This active low output initialises (resets) the printer.
Pin 17 - SLIN#	Signal to select the printer sent from CPU board to printer.
Pin 18 - GND	Ground
Pin 19 - GND	Ground
Pin 20 - GND	Ground
Pin 21 - GND	Ground
Pin 22 - GND	Ground
Pin 23 - GND	Ground
Pin 24 - GND	Ground
Pin 25 - GND	Ground

Pin Assignments - 24P DVI-D & DVI-I



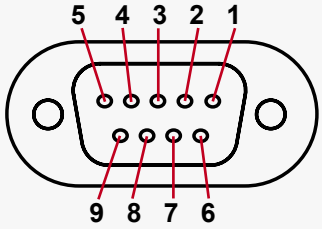
Pin 01	T.M.D.S. Data2 - (Digital - RED link 1)
Pin 02	T.M.D.S. Data2 + (Digital + RED link 1)
Pin 03	T.M.D.S. Data2/4 Shield
Pin 04	T.M.D.S. Data4 - (Digital - GREEN link 2)
Pin 05	T.M.D.S. Data4 + (Digital + GREEN link 2)
Pin 06	DDC Clock
Pin 07	DDC Data
Pin 08	Analog Vertical Sync (DVI-I only)
Pin 09	T.M.D.S. Data1 - (Digital - GREEN link 1)
Pin 10	T.M.D.S. Data1 + (Digital + GREEN link 1)
Pin 11	T.M.D.S. Data1/3 Shield
Pin 12	T.M.D.S. Data3 - (Digital - BLUE link 2)
Pin 13	T.M.D.S. Data3 + (Digital + BLUE link 2)
Pin 14	+5V Power (for standby mode)
Pin 15	Ground (for +5V and analog sync)
Pin 16	Hot Plug Detect
Pin 17	T.M.D.S. Data0 - (Digital - BLUE link 1) and digital sync.
Pin 18	T.M.D.S. Data0 + (Digital + BLUE link 1) and digital sync.
Pin 19	T.M.D.S. Data0/5 Shield
Pin 20	T.M.D.S. Data5 - (Digital - RED link 2)
Pin 21	T.M.D.S. Data5 + (Digital - RED link 2)
Pin 22	T.M.D.S. Clock Shield
Pin 23	T.M.D.S. Clock + (Digital clock + (Links 1 and 2)
Pin 24	T.M.D.S. Clock - (Digital clock - (Links 1 and 2)
Pin C1	Analog RED
Pin C2	Analog GREEN
Pin C3	Analog BLUE
Pin C4	Analog Horizontal Sync.
Pin C5	Analog Ground (return for RGB signals)

DDC = Display Data Channel /// T.M.D.S = Transition Minimized Differential Signal /// PIN C1,C2,C3,C4 = Only present on DVI-I connectors.

Pin Assignments - Common Connectors (Additional)

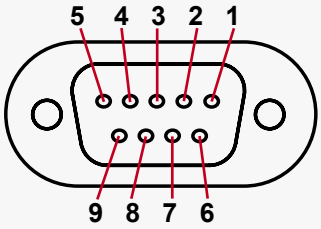
Note: These pin assignments applies for products with customer specified COM ports (factory setup).
These COM ports are configurable on the motherboard located inside the product.
Panel Computers: Attempting to config these yourselves, could result in warranty void as the main cover would have to be removed.

Pin Assignments - 9P Serial COM RS422



Pin 01 - N/C	Not Connected
Pin 02 - TX-	Transmit Data -
Pin 03 - RX+	Receive Data +
Pin 04 - N/C	Not Connected
Pin 05 - GND	Ground
Pin 06 - N/C	Not Connected
Pin 07 - TX+	Transmit Data +
Pin 08 - RX-	Receive Data -
Pin 09 - N/C	Not Connected

Pin Assignments - 9P Serial COM RS485



Pin 01 - N/C	Not Connected
Pin 02 - N/C	Not Connected
Pin 03 - DAT+	Data+
Pin 04 - N/C	Not Connected
Pin 05 - GND	Ground
Pin 06 - N/C	Not Connected
Pin 07 - N/C	Not Connected
Pin 08 - DAT-	Data-
Pin 09 - N/C	Not Connected

Basic Trouble-shooting

COMMON ERRORS: (This is a generic description of possible issues for a varity of products)
If for some reason there should be something wrong with the picture quality or no picture present, check the symptoms carefully and try to cure it with the hints below:

NO PICTURE / LED BEHAVIOUR:
If there is no light at all in the LED at the FRONT, check power cables. If the LED in front is green then check if the brightness knob is turned to the right (max brightness). If still no picture, check if there is a VGA signal on the External VGA connector. If you have a picture on the external VGA connector please look in BIOS documentation/chapter for correct display settings in BIOS. Lack of image is most likely to be caused by incorrect connection, lack of power, or wrong BIOS settings.

SCROLLING / UNSTABLE IMAGE:
Signal cable may not be completely connected to computer or TFT display. Check the pin assignments and signal timings of the display and your video card with respect to recommended timing and pin assignments. Make sure that the video card is compatible and that it is properly seated / installed on the computer.

DISPLAY AREA IS NOT CENTERED / SIZED CORRECTLY
Make sure that a supported video mode has been selected on the display, or on the video card / system. If it is impossible to position the image correctly, i.e. the image adjustment controls will not move the image far enough, then test it again using another graphics card for the PC system. This situation may occur with a custom graphics card that is not close to standard timings or if something is in the graphics line that may be affecting the signal, such as a signal splitter (please note that normally a signal splitter will not have any adverse effect). If it is impossible to change to the correct resolution/color depth, check if you have the right VGA driver installed in your system.

IMAGE APPEARANCE:
A faulty TFT panel can have black lines, pixel errors, failed sections, flickering or flashing image.
Incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, it may scroll, flicker badly or possibly even no image is present. Sparkling on the display may be a faulty TFT panel signal cable, and it needs service attention.

RGB Signal Only:
Horizontal interference can usually be corrected by adjusting the PHASE (OSD menu).
Vertical interference can usually be corrected by adjusting the FREQUENCY (OSD menu).

DEW CONDENSATION BEHIND GLASS:
Power on the TFT product and set brightness to 100%. Turn off any automatic screensavers on PC or similar. During minutes the dew will be gone. To speed up the process, use a fan heater for a reasonable time. Do not overheat the TFT product.

CD-ROM FAILURE OR READ/DETECTION PROBLEMS:
If the product are operated/located in a area with extreme condensation, the CD/DVD drive may not work correctly due to condensation on the read head. Keep the product on for a while until it’s reached normal operating temperature, and retry accessing discs. Otherwise, consider using USB sticks or alternative storage devices.

Declaration of Conformity

We, manufacturer

Jakob Hatteland Display A/S
Åmsosen, N-5578 Nedre Vats, Norway

declare under our sole responsibility that the
MMD, MMC, STD and MIL products
is in conformity with the following standards
in accordance with the EMC Directive

EN 55022 Class A - Emission
EN 55024 - Immunity

Signature:.....
Frode Grindheim
Technical Director
Jakob Hatteland Display A/S

Signature:.....
Arne Kristiansen
Development Engineer
Jakob Hatteland Technology A/S

Date: 08 September 2004

CE

Return Of Goods Information

Return of goods: (Applies not to warrenty/normal service/repair of products)
Before returning goods, please contact your system supplier before sending anything directly to JHD. When you return products after loan, test, evaulation or products subject for credit, you must ensure that all accessories received from our warehouse is returned to JHD.
This applies to cables, powermodules and additional equipment except screws or similar, user manual, datasheets or other written paper documents. Furthermore, the product must not have any minor / medium or severe scratches, chemical spills or similar on the backcover, front frame or glass.

This is needed to credit the invoice 100%. Missing parts will not be subject for credit, and you will not get total credit for returned product. You will either be charged separately or the amount is withdrawn from the credit. If you decide to ship the missing items on the after hand, you will get 100% credit for that particular invoice or items received at JHD incoming goods control.
Please contact our service/sales department if additional questions.

Current prices apply as per May 2004:

Signal Cable DSUB 15P Male or Female - Approx 1,8meters	Price: 170,- NOK each
Signal Cable BNC 5P - Approx 1,8meters	Price: 350,- NOK each
RS-232 serial cable DSUB 9P - Approx 1,8meters	Price: 80,- NOK each
Powercable 110 / 220 VAC (European or US standard) - Approx 1,8meters	Price: 50,- NOK each
Minor / Medium or severe scratches / chemical spill on backcover	Price: 1300,- NOK
Any scratch, chemical spill or similar on front frame (including glass)	Price: 2000,- NOK

(Prices are approx, and any deviation are evaulated during incoming goods control)

Approved packaging methods/materials: (Applies to all shipments to JHD)
When returning goods, please make sure you surround the product with the following material, whenever possible: Original packaging from JHD, firm foam material, bubble wrap or lots of PadPack paper or Foam chips/polyester wrapped in sealed plastic bags. In any case, always use a solid cardboard box to surround everything.

Not approved packaging methods/materials are: Foam chips, expanded polyester, clothes, nothing, or too little, or anything that will crumble and get into the ventilation holes of products and cardboard boxes that are not suitable to secure the product during shipment.

Terms

The Hatteland Group - Terms Of Sale And Delivery:

1) APPLICATION
The terms of sale and delivery include the following companies: Autostore AS, Jakob Hatteland Assembly AS, Jakob Hatteland Computer AS, Jakob Hatteland Display AS, Jakob Hatteland Logistics, Jakob Hatteland Supply AS and Jakob Hatteland Technology AS.

2) PRICE
a) The price is per each, if nothing else has been stated, VAT not included. Price is based on the prices from our suppliers, current custom rates, taxes, rate of exchange and international raw material prices. We reserve ourselves the rights to adjustments in case of alternation on the above mentioned.
b) Included in the price is the supplier's standard packing. In case of re-packing/smaller quantities we reserve ourselves the right to add an additional sum for warrantable packing according to CECC 0015 (Basic inspection for protection of electrostatic sensitive devices)

3) VALIDITY
If nothing else has been stated in our quotation, the offer is valid for 30 days from the date of quotation.

4) PACKAGE QUOTATION
A package quotation means that all the components offered, must be ordered by us. If one component or more are removed from the quotation, the prices given in the package quotation are not valid.

5) TERMS OF PAYMENT
Cash on delivery or payment in advance. Net granted for companies, schools and institutions only, according to agreement. In case of too late payment 1.5% interest/month will be charged. Seller has mortage rights in the goods delivered until the purchase price, additional interests and charges have been paid in full. Accepted bill is not considered as payment until it has been honoured in full.

6) TIME OF DELIVERY
The quoted time of delivery is based on information from our suppliers. We disclaim any responsibility for the consequences of any delay or cancellation from our suppliers. Belated delivery gives not solely the right for cancellation.

7) DELIVERY POINT OF TIME
Goods are considered delivered to customer when handed over to charterer.

8) FREIGHT / PACKING / FORWARDING FEE
Jakob Hatteland Display AS charge NOK 50,- in forwarding fee for orders below NOK 1000,-.
For orders below NOK 1000,- Jakob Hatteland Supply AS charge freight according to expenses, and NOK 25,- for packing. For handling requested beyond ordinary hours NOK 250,- is charged. Express service is charged with NOK 100,- + freight charges. All the companies charge freight according to expenses for orders above NOK 1000,-. VAT not included.

9) COMPLAINT
By receipt customer must check goods for obvious defects which have to be claimed within 8 days from receipt. Otherwise acceptance of complaint can not be counted on.

10) GUARANTEE / SERVICES
Time of guarantee is calculated from our date of shipment, and applies to the extent that we are covered by our supplier's guarantee regulations. The guarantee does no longer apply if:

I) there has been encroached upon the goods without seller's consent
II) terms of payment is not fulfilled
III) the goods have been damaged due to unskilled treatment
IV) components which are sensitive for static electricity have not been unpacked and treated in a secure way. Minimum requirements: CECC 00015's standards for handling of such components. The guarantee does not include fair wear and tear.

Terms

11) RESPONSIBLITY
Seller undertake to deliver faultless and functional capable goods according to existing technical specifications. Seller disclaim responsibility for any damage or loss which directly or indirectly may be caused due to failure or defect with the delivered goods, if carelessness from the seller can be limited up to the cost of the goods. The supplier's responsibility for defects with the supplied goods do not include secondary damage or loss.

12) CANCELLATION / RETURN
Binding sales contract is concluded when we have confirmed customer's purchase order. Any disagreements in our order confirmation must be reported to seller within 6 days. The agreement can not be altered without our permission, after acceptance from our supplier. If goods are wanted to be returned, a Return No must be assigned from seller. Returned goods without a Return No will not be accepted. By return of stock listed goods, 20% return fee is charged. Returned goods are shipped on customer's account and risk.

13) LOAN, RENT and DEMO
When borrowing of goods for demo/test, the date of return must be added to the document. If no date has been stated, date of return is two weeks from the date of the document. Before return, seller must be contacted for a Return No (RTK). Goods which have been sold with an agreed right of return within stated terms, shall also have a Return No. The Return No must be obtained before the stated date of return. Returned goods without a Return No, or which have not been packed in original packing, will not be accepted.

14) LIMITATIONS
If any of our suppliers claim limited delivery terms towards us, our terms of delivery will be restricted according to those.

15) SOFTWARE
Sold or borrowed software is not allowed to be copied or spread in other ways, without a written permission.

16) RE-EXPORT
Goods delivered from seller may be subject to special rules of exportation in their supplier's native country. Buyer is responsible to obtain necessary permissions for further export/re-sale.

17) QUESTION IN DISPUTE
To settle any dispute the Karmsund Herredsrett is approved the legal venue.

Terms

INSTRUCTIONS FOR THE CONSIGNEE

1) CONTROL
Control the goods immediately by receipt. Examine the quantity towards the invoice/packinglist/shipping documents. Look for outward defects on the packing which may indicate damage on or loss of contents. Control the container and the seals for any defects.

2) SECURING EVIDENCE
When defects on the goods have been found, evidence must be secured, and seller must be informed. Call the transporter and point out the defects. Add a description of the defects on the goods receipt, the forwarder's copy of the way-bill or on the driving slip.

3) RESCUE
Bound the damage. Try to restrict the damage and the loss. Seller will compensate expences incurred due to reasonable security efforts in addition to damage and loss.

4) COMPLAINT
Write immediately a complaint to the transporter or his agent. Forward immediately the complaint to the transporter or his agent, and hold the transporter responsible for the defects. The complaint must be sent at the latest:

- for carriage by sea: within 3 days
- for overland / air transportation within 7 days

5) DOCUMENTATION
For any claims the following documentation is required, and must be forwared to the company or their agent:
invoice, way-bill and/or bill of landing, and/or statement of arrival, inspection document, besides a copy of the letter of complaint to the transporter.

Notes

General Notes: (For all products)

- The unit is type approved according to EN60945 4th, 4.4, equipment category b) protected from the weather.

- Other type approvals applies for the different products.
  Please see **Testing & Approvals Overview** section in this manual for more information.

- Use of brightness and push buttons may inhibit visibility of information at night.

Note for ECDIS Systems

For ECDIS systems the brightness knob indication mark should be aligned directly with the indication mark located on the label. (See Physical Overview or Operation section in this manual)

Note for Documentation CD-ROM

The separate and full documentation for third party components (including options that are factory installed) are available on attached CD. The printed physical manual only covers specific information for Hatteland products, and not generally includes third party components.

Notes

Important BIOS Reset / No picture information

Please note that when performing a "Load Optimized Defaults" or "Load Fail-Safe Defaults" command in the BIOS menu, or if the internal ETX processor module was replaced, the picture on the TFT display will be black and the sync will be lost upon restart. No picture will be present on the MMC unit!

However, by using the standard RGB OUT DSUB connector connected to an external TFT Display or CRT Monitor, you will get a cloned picture from the MMC unit. Now you can correctly setup the display properties in the BIOS, which will re-enable the picture to display correctly on the MMC unit again. Please follow the procedure below for your MMC unit.

If you have no external display or monitor available, you can use the *"blind man"* routine:
1: Power on the MMC unit, while pressing <DEL> on the keyboard to enter BIOS setup.
2: Press the <DOWN ARROW> key 2 times, then press <ENTER>
3: Press the <DOWN ARROW> key 17 times, then press <ENTER>
4: Press the <DOWN ARROW> key 5 times (15 inch), 3 times (19/20 inch) or 6 times (23 inch) followed by pressing <ENTER>
5: Press <F10> on the keyboard, and press <ENTER>. The BIOS settings will be saved, and the unit will reset and boot up correctly with picture on the MMC Unit again.

BIOS Setup Menu Reference:

All versions of 15 Inch - JH 15T05MMC-xx (Pentium M)
- Choose "Advanced Chipset Features"
- Choose "Panel Number"
- Choose "1024x768 24bit SC"

All versions of 19 Inch - JH 19T02MMC-xx (Pentium M)
- Choose "Advanced Chipset Features"
- Choose "Panel Number"
- Choose "1280x1024 24bit SC"

All versions of 20 Inch - JH 20T05MMC-xx (Pentium M)
- Choose "Advanced Chipset Features"
- Choose "Panel Number"
- Choose "1280x1024 24bit SC"

All versions of 23 Inch - JH 23T02MMC-xx (Pentium M)
- Choose "Advanced Chipset Features"
- Choose "Panel Number"
- Choose "1600x1200 24bit SC"

When done, please refer to the BIOS manual if you need to change other options (available on separate/attached CD for your specific product).

Revision History

Rev.	By	Date	Notes
1	SE	02 Sep 04	First release internet version. Products covered, JH 15T05 and JH 19T02
2	SE	26 Oct 04	Added pin assignments for RS422 and RS485
3	SE	08 Nov 04	Updated important security information regarding the Compact Flash Slot.
4	SE	04 Mar 05	Updated 19 Inch specification and Testing & Type Approval section. Added JH 23T02 MMC. Added Bracket Mounting Precautions and drawings.
5	SE	17 Mar 05	Updated Testing and Type Approval Section.
6	SE	21 Jun 05	Revised specifications.
7	SE	17 Aug 05	Revised Physical Connections Section.
8	SE	24 Aug 05	Added technical drawings for JH 19T02 MMC with bracket.
9	SE	7 Sep 05	Revised specifications.
10	SE	18 Nov 05	Revised specifications.
11/12	SE	22 May 06	Revised frontpage/design, updated Testing and Type Approvals section.
13	SE	22 Aug 06	Type approval page removed, and information merged with the respective product specification pages.
14	SE	15 Sep 06	Revised specifications. Changed 5400 rpm to 4200 rpm
15	SE	02 Oct 06	Added JH 10T08 MMC

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